EXPRESS5800/120Ld

User's Guide

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User's Guide

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Using This Guide

The EXPRESS5800/120Ld User's Guide provides a quick reference to information about your system. Its goal is to familiarize you with your system and the tasks necessary for system configuring and upgrading.

This guide contains the following information:

- Chapter 1, **"**System Overview" provides an overview of your system and describes your system's major system components. See this chapter to familiarize yourself with your system.
- Chapter 2, "Setting Up Your System" tells you how to select a site, unpack the system, assemble the rack-mount subsystem, make cable connections, and power on your system.
- Chapter 3, "Configuring Your System" tells you how to configure the system and provides instructions for running the BIOS Setup Utility and the Adaptec Configuration Utility, which is used to configure SCSI devices in your system. This chapter also provides information on system board jumper settings.
- Chapter 4, "Upgrades and Options" provides you with instructions for upgrading your system with an additional processor, optional memory, options cards, peripheral devices, and redundant power supply.
- Chapter 5, "Problem Solving" contains helpful information for solving problems that might occur with your system.
- Appendix A, "System Cabling" includes cabling information for the two onboard SCSI controllers, the onboard IDE controller, and the optional RAID controllers.
- Appendix B, "Management Workstation Application (MWA)" provides you with information on using MWA for managing your server remotely in a network environment.
- Appendix C, "System Status Hardware Support Information" helps you identify a system status hardware item indicated by a software monitoring component.
- "Glossary" defines the standard acronyms and technical terms used in this manual.
- "Equipment Log" provides you with a sample equipment log for documenting the system configuration and future updates you may make to your system.

Text Conventions

This guide uses the following text conventions.

Warnings, cautions, and notes have the following meanings:

⚠ WARNING

Warnings alert you to situations that could result in serious personal injury or loss of life.

⚠ CAUTION

Cautions indicate situations that can damage the system hardware or software.

Note: Notes give important information about the material being described.

- Names of keyboard keys are printed as they appear on the keyboard. For example, **Ctrl**, **Alt**, or **Enter**.
- Text or keystrokes that you enter appear as boldface type. For example, type **abc123** and press **ENTER**.
- File names are printed in uppercase letters. For example, AUTOEXEC.BAT.

Related Documents

In addition to this guide, the following system documentation is included with your server either as electronic files on EXPRESSBUILDER or as paper copy shipped with your server.

- *System Release Notes*
 Release Notes provide you with the latest information about your system. This information was not available to be included in your user's guide at the time it was developed and released.
- *Getting Started Sheet*
 The Getting Started Sheet provides several easy-to-follow steps to become familiar with your server documentation and to complete your installation successfully.
- *Network Operating System Configuration Guide*
 This guide contains supplemental instructions needed to install and configure your server Windows NT 4.0 plus Service Pack 6, Novell NetWare v5.0, Santa Cruz Operation (SCO) OpenServer Release 5.05, and UNIXWare 7.1 Network Operating Systems. This document is intended to complement the more detailed procedural documents available from the vendor of the network operating system.

Safety Notices



- **Caution:** To reduce the risk of electric shock which could cause personal injury, follow all safety notices. The symbols shown are used in your documentation and on your equipment to indicate safety hazards.
- **Warning:** Lithium batteries can be dangerous. Improper handling of lithium batteries may result in an explosion. Dispose of lithium batteries as required by local ordinance or as normal waste if no local ordinance exists.
- **Warning:** The detachable power supply cord is intended to serve as the disconnect device.
- **Warning:** This equipment has a 3-wire, grounded power cord. To prevent electrical hazards, do not remove or defeat the ground prong on the power cord. Replace the power cord if it gets damaged. Contact your dealer for an exact replacement.
- **Warning:** The DC push-button on/off switch on the front panel does not turn off the system AC power. Also, +5vdc is present on the system board whenever the AC power cord is connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cord from the back of the chassis. Failure to disconnect power before opening your system can result in personal injury and equipment damage.

In the U.S.A. and Canada, the power cord must be a UL-listed detachable power cord (in Canada, CSA-certified), type ST or SJT, 16 AWG, 3-conductor, provided with a molded-on NEMA type 5-15 P plug cap at one end and a molded-on cord connector body at the other end. The cord length must not exceed 9 feet (2.7 meters).

Outside the U.S.A. and Canada, the plug must be rated for 250 VAC, 10 amp minimum, and must display an international agency approval marking. The cord must be suitable for use in the end-user country. Consult your dealer or the local electrical authorities if you are unsure of the type of power cord to use in your country. The voltage change occurs via a switch in the power supply.

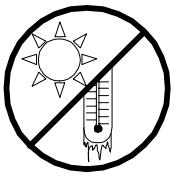
- **Warning:** Under no circumstances should the user attempt to disassemble the power supply. The power supply has no user-replaceable parts. Inside the power supply are hazardous voltages that can cause serious personal injury. A defective power supply must be returned to your dealer.

Safety Notices for Users Outside of the U.S.A. and Canada

- **PELV (Protected Extra-Low Voltage) Integrity:** To ensure the extra-low voltage integrity of the equipment, connect only equipment with mains-protected electrically-compatible circuits to the external ports.
- **Remote Earths:** To prevent electrical shock, connect all local (individual office) computers and computer support equipment to the same electrical circuit of the building wiring. If you are unsure, check the building wiring to avoid remote earth conditions.
- **Earth Bonding:** For safe operation, only connect the equipment to a building supply that is in accordance with current wiring regulations in your country. In the U.K., those regulations are the IEE.

Care and Handling

Use the following guidelines to properly handle and care for your system.



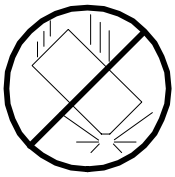
Protect the system from extremely low or high temperatures. Let the system warm (or cool) to room temperature before using it.



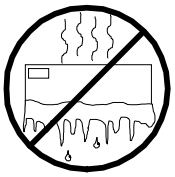
Keep the system away from magnetic forces.



Keep the system dry. Do not wash the system with a wet cloth or pour fluid into it.



Protect the system from being bumped or dropped.



Check the system for condensation. If condensation exists, allow it to evaporate before powering on the system.



Keep the system away from dust, sand, and dirt.

1

System Overview

- Overview
- System Chassis
- Power Supply
- Peripheral Bays
- SAF-TE Logic
- System Board Features
- AC Link Mode
- Remote Power-On (Wake On LAN) Function
- System Security

Overview

This server is a modular, multiprocessing server based on the Intel® Pentium® III microprocessor family. It is a solid performer and offers the latest technology. The combination of compute performance, memory capacity, and integrated I/O provides a high performance environment for many server market applications. These range from large corporations supporting remote offices to small companies looking to obtain basic connectivity capability such as file and print services, e -mail, web access, web site server, etc.

This server is conveniently housed and available as a tower-based system or as a rack-mount system (fits into a standard EIA 19-inch rack assembly) as shown in Figures 1-1 and 1-2.

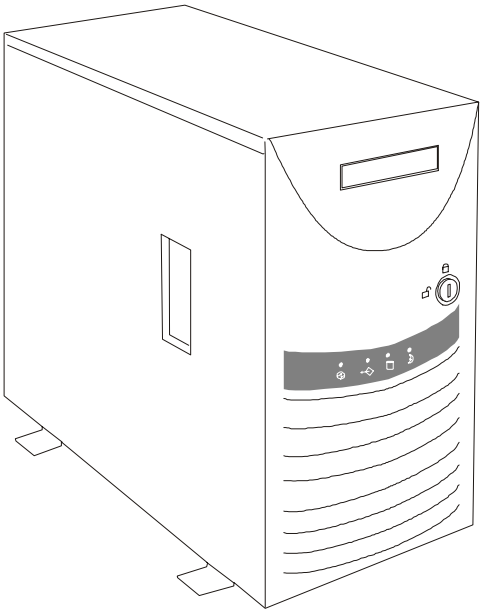


Figure 1-1. Tower-Based System Front View

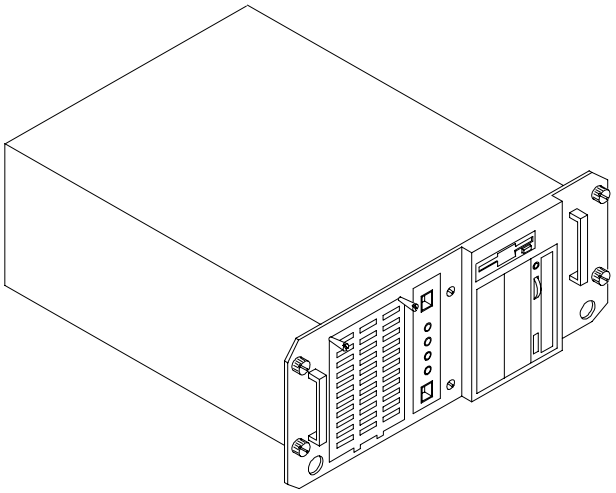


Figure 1-2. Rack-Mount System Front View

Your server may include standard non-hot-swap SCSI hard disk drive bays or hot-swap SCSI hard disk drive bays. See Figure 1-3. The standard SCSI hard disk drive bays support four 1-inch or four 1.6-inch SCSI hard disk drives. The hot-swap SCSI hard disk drive bays hold up to six 1.0-inch SCSI hard disk drives that can be swapped in or out of the system without powering it down, if RAID is configured in the system.

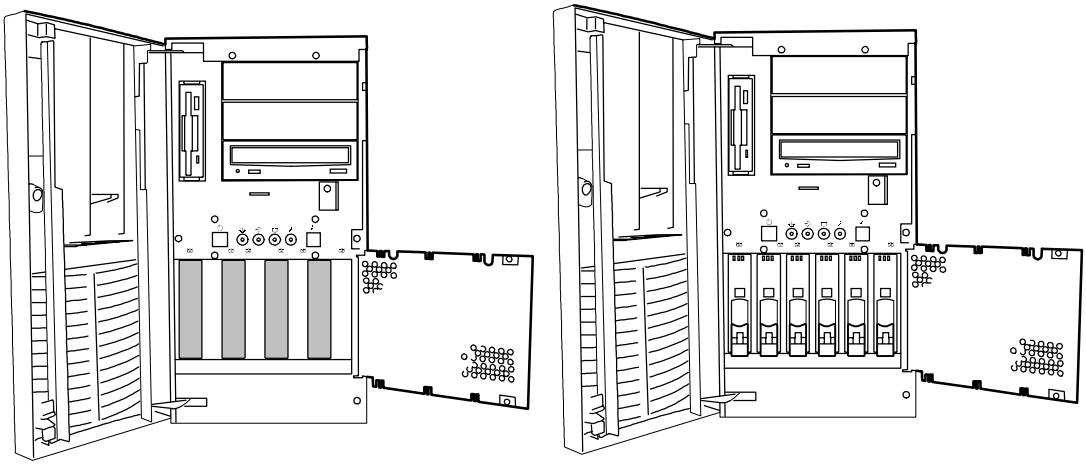


Figure 1-3. SCSI Hard Disk Drive Bays

As application requirements increase, you can expand your server with an additional processor, additional memory, add-in boards and peripheral devices: tape devices, CD-ROM, and hard disk drives.

Your server features the following major components:

- Single or dual high-performance Pentium III processors packaged in Single Edge Contact Cartridge Version 2 (SECC2).
- 64 MB to 4 GB of memory, using up to four DIMMs.
- Seven PCI expansion slots for add-in boards (one slot shared with an ISA slot).
- One ISA expansion slot shared with a PCI slot for add-in board.
- Embedded PC-compatible support (serial, parallel, mouse, keyboard, diskette, USB, LAN, and video).
- Integrated onboard ATI RAGE IIC Super Video Graphics Array (SVGA) controller with 4 MB of video memory.
- Adaptec AIC7899 SCSI controller providing Wide Ultra2 and Ultra-160/M SCSI interfaces.
- Integrated onboard Network Interface Controller (NIC), an Intel 82559 PCI LAN controller for 10 or 100 Mbps Fast Ethernet networks with an RJ-45 Ethernet connector.
- Single Channel enhanced IDE controller.
- Three 5 ¼-inch removable media expansion bays with a CD-ROM drive installed in one bay and a 3 ½-inch half-height bay with a diskette drive installed.

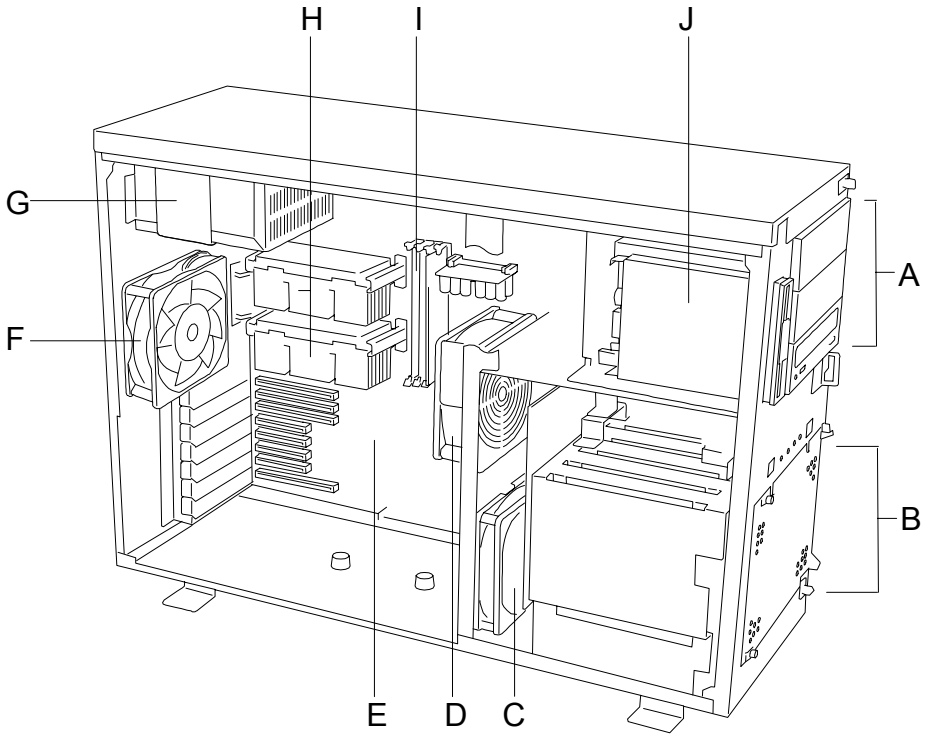
- Integrated dual Universal Serial Bus (USB) ports.
- Hardware monitors (temperature, fans, and voltage) and software monitors to indicate failures.
- Redundant cooling fans.
- A 300 watt switch-selectable power supply.
- Keylocked front cover, including an intrusion switch (tower system only) and an interlock switch on the side cover.

Hot-Swap SCSI Hard Drive Bays

- Six hot-swap 1.0-inch SCSI hard disk drive bays accessible from the front of the chassis which can be swapped in or out of the system without powering it down if RAID is configured in the system.
- High degree of SCSI disk fault tolerance and advanced disk array management features through the use of RAID technology, if an optional RAID controller is installed.
- SCSI backplane is Ultra-160/M ready.

System Chassis

The system chassis (Figure 1-4) is an easy-to-expand, fabricated metal structure. The major system components are shown in the following illustrations.



A. Removable Media Bay

B. SCSI Hard Disk Drive Bays

C. SCSI Hard Disk Drive Bay Fan

D. Front Input Fan

E. System Board

F. Rear Exhaust Fan

G. System Power Supply

H. Pentium III Processors (2nd Processor is optional)

I Memory

J Diskette Drive

Figure 1-4. System Chassis

Power Supply

The ATX300 watt power supply is switch-selectable for 115 or 230 Vac at an operating frequency of 50/60 Hz. It is designed to comply with existing emission standards and provides sufficient power for a fully loaded system configuration. The power supply voltage selection switch is factory set to 115Vac for systems used in the United States; it is set to 230Vac for systems used in Europe.

Peripheral Bays

The system supports a variety of standard PC AT-compatible peripheral devices. The chassis includes these peripheral bays:

- A 3.5-inch front panel bay for mounting the standard 3.5" diskette drive (supports 720 KB and 1.44 MB diskette media)
- Three 5.25-inch removable media front panel bays for mounting half-height 5.25-inch peripheral devices: standard CD-ROM drive and optional tape drives, etc.
- Your system includes either four standard SCSI hard disk drive bays for mounting up to four drives or six hot-swap drive bays for mounting up to six drives in easily removable drive carriers.

> ***Note:*** The hot-swap SCSI hard disk drive bays contain a hot-swap back plane that require an 80-pin single connector attachment (SCA) connector on the drives that you install.

SAF-TE Logic

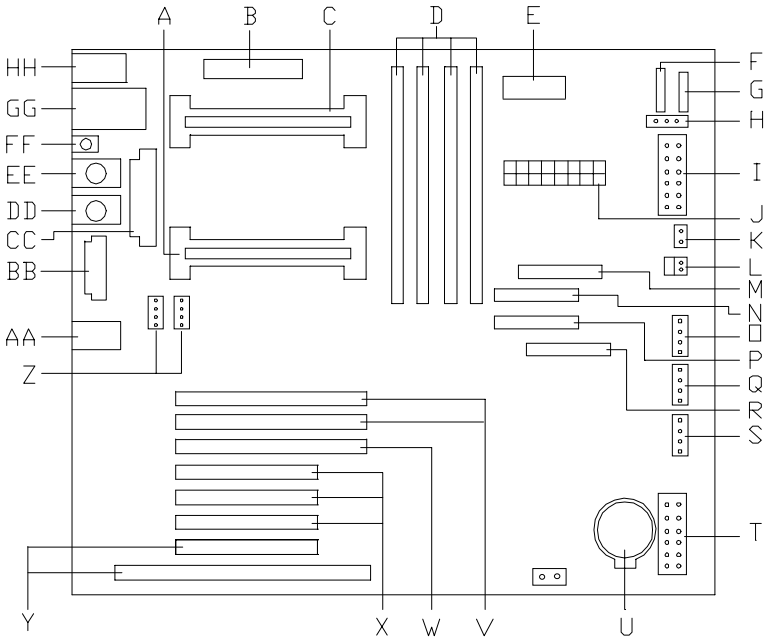
> ***Note:*** SAF-TE Logic is in systems that include the hot-swap SCSI disk drive cage. SAF-TE Logic is not available in systems that include the standard SCSI disk drive cage.

The SCSI backplane includes SAF-TE (SCSI Accessed Fault Tolerant Enclosure) logic that provides an interface to the disk subsystem that supports status signals, hot swapping drives, and enclosure monitoring.

The transport mechanism for the standardized alert detection and status reporting is the SCSI bus. Disk drives, power supplies, cooling fans, and temperature are continually monitored and the conditions then reported over the SCSI bus to the system. When used with RAID management software the user can be alerted of impending or imminent disk conditions requiring attention. This allows the user to react to conditions that could normally go unnoticed until data loss.

System Board Features

The system board (Figure 1-5) offers a "flat" design with the processor and memory subsystems residing on the board. This figure shows the major components on the system board. The following subsections describe the system board major components.



A.	Primary processor connector	R	Internal SCSI HDD bay connector
B.	Not used	S.	Not used
C.	Secondary processor connector	T.	Jumper block
D.	Memory DIMM slots	U.	Lithium backup battery
E.	Secondary VRM	V.	64 bit, 66MHz PCI slots for add-in boards
F.	Front panel LEDs connector	W.	64 bit, 33MHz PCI slots for add-in boards
G.	Power switch and Interlock switch connector	X.	32 bit, 33MHz PCI slots for add-in boards
H.	Not used	Y.	PCI/ISA shared slot for add-in board
I.	Management interface connector	Z.	Fan connectors (Fan1, Fan2)
J.	Main power connector	AA	LAN RJ-45 network controller connector
K.	Reset switch connector	BB	SVGA monitor port connector
L.	Speaker connector	CC	Parallel port connector
M.	Diskette drive connector	DD	Mouse PS/2 compatible connector
N.	IDE connector	EE	Keyboard PS/2 compatible connector
O.	Fan3 connector	FF	Dump button (Reserved for debug only)
P.	External SCSI and media bays connector	GG	Serial port connectors (top COM 1, bottom COM2)
Q.	Fan4 connector	HH	USB connectors (top USB 1, bottom USB 2)

Figure 1-5. System Board

Pentium III Processor

Depending on system configuration, each system includes one or two Pentium III processors. Each Pentium III processor is packaged in a Single Edge Contact Cartridge Version 2 (SECC2). The cartridge includes the processor core with an integrated 16 KB primary (L1) cache, a secondary (L2) cache, and a back cover. The processor implements the MMX™ technology and the processor's numeric coprocessor significantly increases the speed of floating-point operations.

The processor external interface operates at a maximum of 133 MHz. The second-level cache is located on the substrate of the processor cartridge. The cache includes burst pipelined synchronous static RAM (BSRAM).

System Memory

The system board contains four 168-pin DIMM sockets. Memory is partitioned as four banks of SDRAM registered DIMMs (PC133 compatible), each providing 72 bits of noninterleaved memory (64-bit main memory plus ECC). Your system may include from 64 MB to 4 GB of memory, using up to four DIMMs.

System memory begins at address 0 and is continuous (flat addressing) up to the maximum amount of DRAM installed (exception: system memory is noncontiguous in the ranges defined as memory holes using configuration registers). The system supports both base (conventional) and extended memory.

I/O Expansion Slots

The server's expansion capabilities meet the needs of file and application servers for high performance I/O by providing a combination of PCI and ISA expansion slots.

The system board has two 66 MHz PCI connector slots (Figure 1-6, A) that can accommodate either a 32 or 64 bit PCI card and one 33 MHz PCI connector slot (Figure 1-6, B) that can accommodate either a 32 or 64 bit PCI card. The top two PCI connector slots (PCI 1 and PCI 2) support bus speeds up to 66 MHz. The third connector slot (PCI 3) supports a bus speed of up to 33 MHz.

> ***Note:*** The bus speed for the two 66 MHz PCI connector slots (PCI 1 or PCI 2) is decreased to 33 MHz if a PCI card is installed into connector slot PCI 3 or if a 33 MHz PCI card is installed into any one of the two 66 MHz PCI connector slots.

PCI features:

- Bus speed up to 66 MHz (PCI 1 and PCI 2)
- Bus speed up to 33 Mhz (PCI 3)
- 32-bit memory addressing
- 5 V/3.3 V signaling environment
- Burst transfers up to a peak of 264 MB/s (64 bit, 33 MHz PCI) and 528 MB/s (64 bit, 66 MHz PCI)
- 8-, 16-, 32-, or 64-bit data transfers
- Plug and Play ready
- Parity enabled.

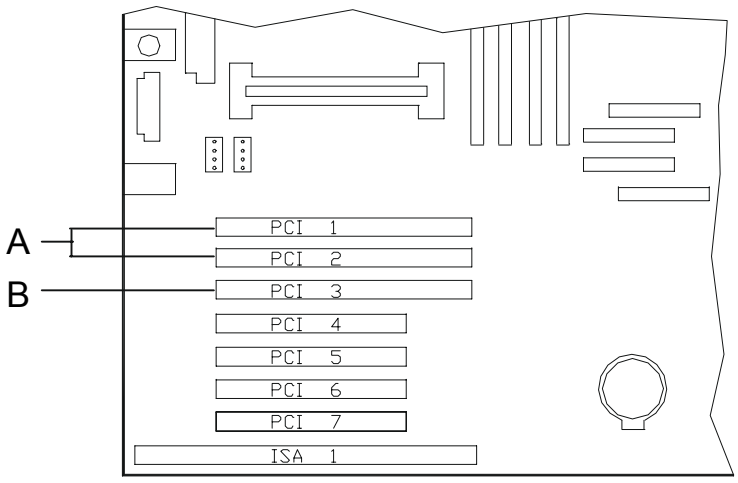


Figure 1-6. 64 Bit PCI Connector Slots

The system board has four 33 MHz, 32 bit, PCI connector slots (Figure 1-7, A), as shown in the following figure. The bottom PCI connector (PCI 7) shares a chassis connector slot with an ISA connector (ISA 1).

PCI features:

- Bus speed up to 33 MHz
- 32-bit memory addressing
- 5 V signaling environment
- Burst transfers up to a peak of 132 MB/s
- 8-, 16-, or 32-bit data transfers
- Plug and Play ready
- Parity enabled.

Note: If a 33 MHz PCI card is installed into one of the 66 MHz PCI slots, the bus speed for the 66 MHz PCI slots is decreased to 33 MHz.

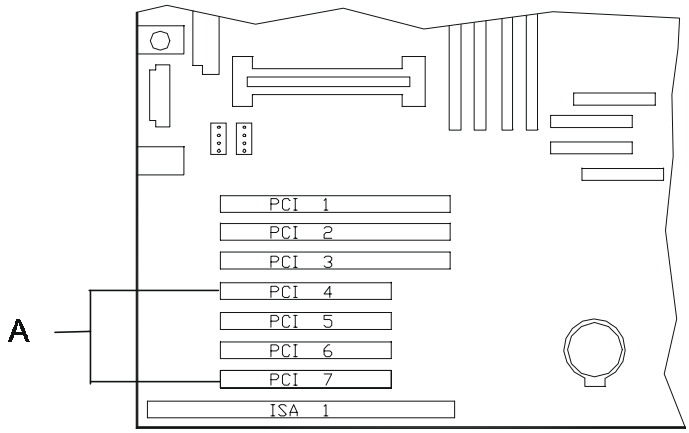


Figure 1-7. 32 Bit PCI Connector Slots

The system board has one ISA connector (Figure 1-8, A), as shown in the following figure. The ISA connector (ISA 1) shares a chassis connector slot with a PCI connector (PCI 7).

ISA features:

- Bus speed up to 8.33 MHz
- 16-bit memory addressing
- 8- or 16-bit data transfers
- Plug and Play ready.

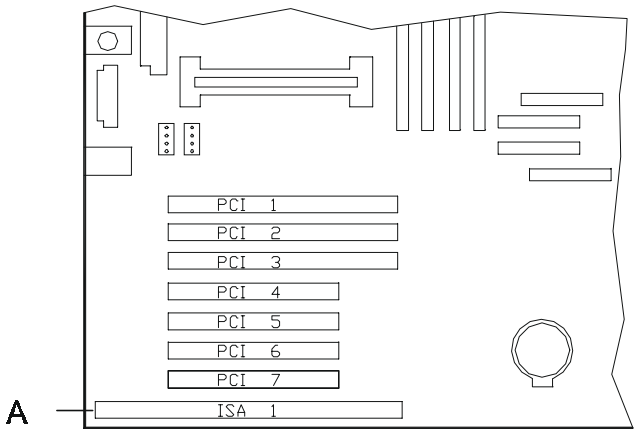


Figure 1-8. Shared ISA/PCI Connector Slot

Real-Time Clock/Calendar

The real-time clock provides system clock/calendar information stored in a non-volatile memory (NVRAM). The real-time clock battery provides power backup for the real-time clock.

BIOS

A BIOS and Setup Utility are located in the Flash EPROM on the system board and include support for system setup and Legacy device configuration. A number of security, reliability, and management features also have been incorporated to meet vital server needs.

IDE Controller

The system includes a single channel enhanced IDE 32 bit interface controller for intelligent disk drives with disk controller electronics onboard. The controller has a connector located on the system board that supports a master and a slave device. The IDE controller provides support for the internally mounted CD-ROM.

The device controls:

- PIO and DMA transfer modes
- Mode 4 timings
- Transfer rates up to 33 MB/s
- Buffering for PCI/IDE burst transfers
- Master/slave IDE mode
- Up to two devices.

Keyboard and Mouse Controller

The keyboard and mouse controller is PS/2 compatible.

Network Controller

The system board includes a 10BASE-T/100BASE-TX network controller based on the Intel 82559 Fast Ethernet PCI Bus Controller. As a PCI bus master, the controller can burst data at up to 132 MB/sec. The controller contains two receive and transmit FIFO buffers that prevent data overruns or underruns while waiting for access to the PCI bus. The controller has the following:

- 32-bit PCI bus master interface (direct drive of bus), compatible with *PCI Bus Specification, Revision 2.1*
- Chained memory structure with improved dynamic transmit chaining for enhanced performance
- Programmable transmit threshold for improved bus utilization
- Early receive interrupt for concurrent processing of receive data
- On-chip counters for network management
- Autodetect and autoswitching for 10 or 100 Mbps network speeds
- Support for both 10 Mbps and 100 Mbps networks, capable of full or half duplex, with back-to-back transmit at 100 Mbps.
- Support for Wake On LAN.

The network status LEDs on the system board indicate:

- Transmit/receive activity on the LAN
- Valid link to the LAN
- 10/100 Mbps transfer mode.

SCSI Controller

The system board includes an embedded Adaptec AIC7899 dual function SCSI controller. The AIC7899 provides Ultra-160/M and Wide Ultra2 SCSI interfaces as two independent PCI functions. As implemented on the system board, interface A attaches to an Ultra-160/M SCSI backplane that supports up to six Ultra-160/M SCA drives. Controller B, the Wide Ultra 2 SCSI interface, may be used to support SCSI devices in the removable media bays.

Video Controller

The system has an integrated ATI Rage IIC 64 bit high-performance SVGA subsystem that supports the following:

- BIOS compatibility with VGA, EGA, CGA, Hercules Graphics, and MDA
- 4 MB of 10 ns onboard Synchronous Graphics Memory (SGRAM)
- Pixel resolutions up to 1280 X 1024
- Analog VGA monitors (single and multiple frequency, interlaced and noninterlaced) with a maximum vertical retrace noninterlaced frequency of 100 Hz.

Peripheral Controller

The advanced integrated peripheral controller supports two serial ports, two universal serial ports, one parallel port, diskette drive, PS/2-compatible keyboard and mouse, and integrated Real Time Clock (RTC). The system provides the connector interface for each port.

Serial Ports

Both serial ports are relocatable. Each serial port can be set to one of four different addresses and can be enabled separately. When disabled, serial port interrupts are available to add-in boards.

Parallel Port

One IEEE 1284-compatible 25-pin bidirectional EPP (supporting levels 1.7 and 1.9) parallel port is provided. BIOS programming enables the parallel port and determines the port address and interrupt. ECP mode is supported with 2 possible DMA channels. When disabled, the interrupt is available to add-in boards.

External Device Connectors

The external I/O connectors provide support for a PS/2 compatible mouse and a keyboard, for a SVGA monitor, 2 serial port connectors, a parallel port connector, LAN port, and two USB connections for devices other than keyboard or mouse.

System Board Management Controller (BMC)

Server management is concentrated in the System Board Management Controller (BMC). The BMC and associated circuitry are powered from a 5Vdc standby voltage, which remains active when system power is switched off, but the ac power source is still on and connected.

The BMC supports the Management Workstation Application (MWA), which allows remote server management via a modem or direct connection to a manager system. Events monitored by the manager system include over-temperature and over-voltage conditions, fan failure, or chassis intrusion.

Information on the Management Workstation Application (MWA) may be found in Appendix B of this User's Guide.

One major function of the BMC is to autonomously monitor system management events, and log their occurrence in the nonvolatile System Event Log (SEL). The events being monitored include overtemperature and overvoltage conditions, fan failure, or chassis intrusion. To enable accurate monitoring, the BMC maintains the nonvolatile Sensor Data Record (SDR), from which sensor information can be retrieved. The BMC provides an ISA host interface to SDR sensor information, so that software running on the server can poll and retrieve the server's current status.

The BMC performs the following:

- Monitors server board temperature and voltage
- Monitors processor presence and controls Fault Resilient Boot (FRB)
- Detects and indicates baseboard fan failure
- Manages the SEL interface
- Manages the SDR Repository interface
- Monitors the SDR/SEL timestamp clock
- Monitors the system management watchdog timer
- Monitors the periodic SMI timer
- Monitors the event receiver
- Controls secure mode, including video blanking, diskette write-protect monitoring, and front panel lock/unlock initiation
- Controls Wake On LAN via Magic Packet support.

ACPI

The Advanced Configuration and Power Interface (ACPI) aware operating system can place the system into a state where the hard drives spin down, the system fans stop, and all processing is halted. However, in this state the power supply is still on and the processors are still dissipating some power such that the power supply fan and processor fans are still running.

> ***Note:*** ACPI requires an operating system that supports its feature.

This server system BIOS supports sleep states s0, s1, s4, and s5. However, with future versions of Microsoft Windows 9X that support ACPI, the system BIOS only supports sleep states s0, s1, and s5. With future versions of Microsoft Windows NT that support ACPI, the system BIOS will only support sleep states s0, s1, s4, and s5.

> **⚠ CAUTION**
> Only when the AC power is disconnected is the system completely off.

The sleep states are defined as follows:

- s0: Normal running state.
- s1: Processor sleep state.
 No context will be lost in this state and the processor caches will maintain coherency.
- s4: Hibernate or Save to Disk.
 The memory and machine state are saved to disk. Pressing the power button or other wakeup event restores the system state from the disk and resumes normal operation. This assumes that no hardware changes have been made to the system while it was off.
- s5: Soft off.
 Only the RTC section of the chipset and the BMC are running in this state.

AC Link Mode

The AC link mode allows the system to monitor its AC input power so that when the AC input power is lost and then restored the system will return itself to one of three pre-selected settings, listed as follows:

- Power On
- Last State (Factory Default Setting)
- Stay Off.

The AC link mode settings can be changed by running the BIOS Setup Utility (F2). Refer to Chapter 3 "Configuring Your System."

Remote Power-On (Wake ON LAN) Function

The remote power-on function turns on the system power by way of a network or modem. If the system power is set to OFF, it can be turned on remotely by sending a specific packet from the main computer to the remote system. This feature can be enabled or disabled using the BIOS Setup Utility. See Chapter 3.

System Security

To help prevent unauthorized entry or use of the system, the system includes a full lockable front panel and Server Management software that monitors the system intrusion switches.

Security with Mechanical Locks and Monitoring

The front panel of the tower-based system contains a mechanical lock and an intrusion switch to prevent access to the front of the computer chassis. The computer chassis includes an interlock switch on the side cover. When any these covers are opened, the switch transmits an alarm signal to the system board, where server management software processes the signal.

Software Locks via the System Setup Utility

The BIOS Setup Utility provides a number of security features to prevent unauthorized or accidental access to the system. Once the security measures are enabled, access to the system is allowed only after the user enters the correct password(s). For example:

- Enable the keyboard lockout timer so that the server requires a password to reactivate the keyboard and mouse after a specified time-out period—1 to 120minutes.
- Set and enable an administrative password.
- Set and enable a user password
- Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel reset and power switches.
- Disable writing to the diskette drive when secure mode is set.

2

Setting Up the System

- Overview
- Selecting a Site
- Unpacking the System
- Rack-Mount Subsystem Assembly
- Getting Familiar with the System
- Making Connections
- Setting the Line Voltage
- Connecting the Power Cord
- Powering On Your System

Overview

This chapter describes how to select a site, unpack the system, make cable connections, and power on the tower-based or rack-mount system units. Also, provided are the instructions for assembling the rack-mount system unit.

Selecting a Site

The system operates reliably in a typical office environment. Choose a site that is:

- Near grounded, three-pronged power outlets.

Note: For the United States and Canada, this means a NEMA 5-15R outlets for 100-120 VAC or NEMA 6-15R outlets for 200-240 VAC. For other international sites, this means three-pronged power outlets applicable for the electrical code of the region.

⚠ WARNING

Be sure the power service connection is through a properly grounded outlet.

⚠ CAUTION

When two power supplies are installed in the system the power plug from each of the power supplies must be plugged into the same common ground power outlets.

- Clean, dust-free, and well ventilated. Front and rear ventilating openings kept free of obstructions. Away from sources of heat, vibration or physical shock.
- Isolated from strong electromagnetic fields and electrical noise produced by electrical devices (such as air conditioners, large fans, large electric motors, radio and TV transmitters, and high-frequency security devices)
- Spacious enough to provide at least five inches (13 centimeters) behind the system and three inches (eight centimeters) on each side of the system for proper cooling, airflow, and cable clearance.
- Easily accessible for system maintenance and installation of system upgrades.

Unpacking the System

⚠ WARNING

Your system weighs approximately 65 pounds (29.25 kg). If your system contains numerous optional boards and peripheral devices, it will weigh more. To avoid personal injury, make sure you have someone help you lift or move the system.

When you receive your system, inspect the shipping containers prior to unpacking. If the shipping boxes are damaged, note the damage, and if possible, photograph it for reference. After removing the contents of the containers, keep the cartons and the packing materials. If the contents appear damaged when you unpack the boxes, file a damage claim with the carrier immediately.

Rack-Mount Subsystem Assembly

This section provides the instructions for assembling the rack-mount server unit into a standard EIA 19-inch rack cabinet.

Before You Begin

Before you begin, please review the following cautions, warnings, and general guidelines.

⚠ WARNING

Be sure that power to the system is turned off and unplugged. All voltage is removed only when the power cords are unplugged.

- Avoid excessive vibration and shock. Dropping an electronic component can cause serious damage.
- Do not disconnect or remove parts other than those specified in the procedure.
- Do not touch I/O connector pins.
- All screws are Phillips-head, unless otherwise specified.
- On completion of any assembly or reassembly, perform a power-on test. If a fault occurs, verify that the assembly or reassembly was performed correctly. If the problem persists, see "Problem Solving" in Chapter 5.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Assembly

This section describes how to assemble your rack-mount server unit into a standard EIA 19-inch rack cabinet.

⚠ CAUTION

Ensure that the location of the rack-mount server unit does not create an unstable condition when installed in the rack cabinet.

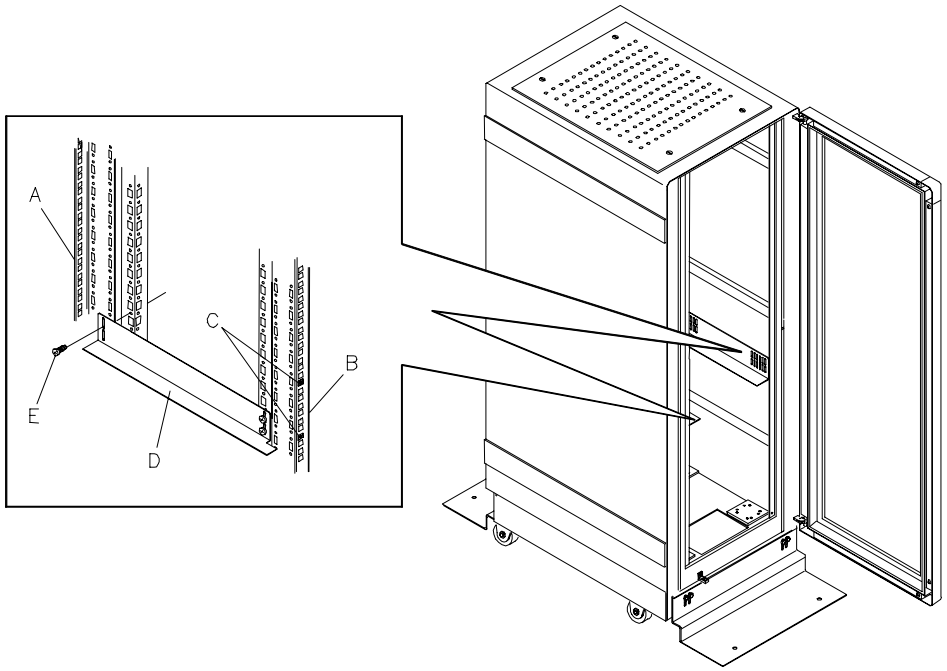
Note: Refer to Figure 2-1 while Steps 2 and 3 of this procedure.

1. Select an appropriate location in your rack cabinet for the rack-mount server unit. To improve rack stability, mount heavier items towards the bottom of the rack cabinet.

 Note: When planning your system configuration for the rack cabinet you should consider the length of the cables that interconnect system components.

2. Locate the two support brackets (D). Using four self tapping screws (E) supplied with the rack cabinet for each support bracket, attach the two support brackets to the vertical mounting rails (A and B) of the rack cabinet.
3. Install the four caged nuts (C) that secure the front of the rack-mount server unit to the rack cabinet. Position the caged nuts to align with the screw holes in the front bezel of the rack-mount server unit.

 Note: The caged nuts are secured into the vertical mounting rails of the rack cabinet by inserting one side of the nut into the slot and squeezing while pressing the opposite side until it snaps into place.



A. Rear vertical mounting rail

B. Front vertical mounting rail

C Four caged nuts

D Two support brackets

E Eight self-tapping screws

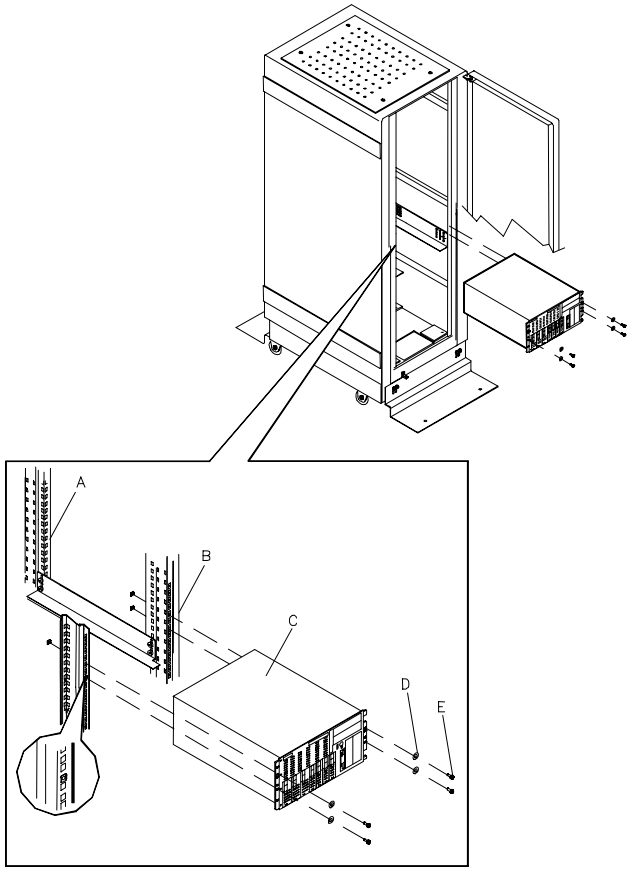
Figure 2-1. Assembling the Support Brackets in the Rack Cabinet

4. Lift the rack-mount server unit Figure 2-2, C onto the two support brackets and slide it toward the rear of the rack cabinet.

⚠ WARNING

It is strongly recommended that two people are present when lifting and assembling the rack-mount server unit into a rack cabinet.

5. Secure the front bezel to the rack cabinet's front vertical mounting rails (B) using the four screws (E) and plastic washers (D) provided. See Figure 2-2.



A. Rear vertical mounting rail

B. Front vertical mounting rail

C Rack-mount server unit

D Four plastic washers

E Four screws

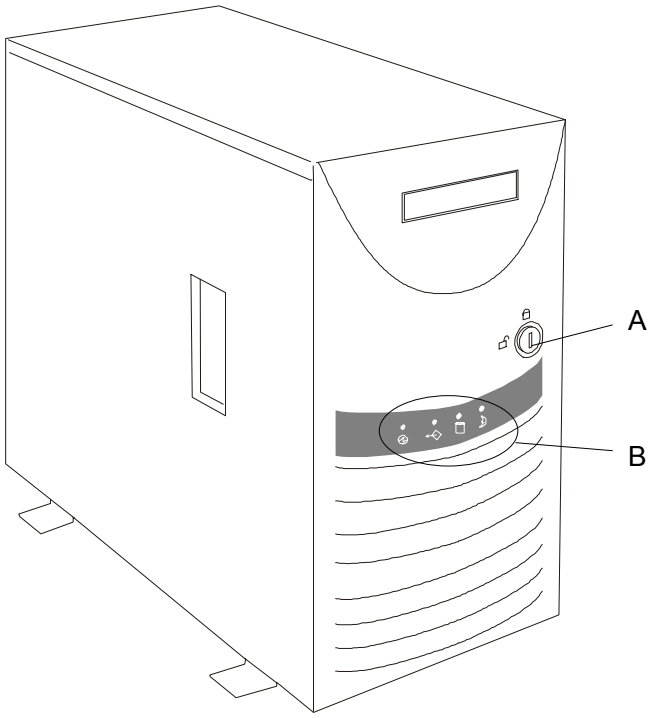
Figure 2-2. Installing the Rack-Mount Server Unit into the Rack Cabinet

Getting Familiar with the System

Before setting up your system, you should become familiar with the system's features, such as the location of your system's front and rear panel switches, indicators and connectors, etc. Note that this section describes the tower-based system controls (switches and indicators) and connectors, which are identical for the rack-mount system.

Front View with Front Door Closed

Figure 2-3 shows the location of the front system features (tower-based system only).



A.	Keylock	When locked, secures the front door not allowing access to the front system controls.
B.	System indicators	Refer to Figures 2-5 and 2-6 in this chapter.

Figure 2-3. Tower System Front Features

Opening the Front Door

Refer to the Figure 2-4 and open the front door of the cabinet as follows (tower-based system only).

1. If the front door is locked, unlock it.
2. Grasp the indentation located on the right edge of the front door and pull the door towards you to open it.

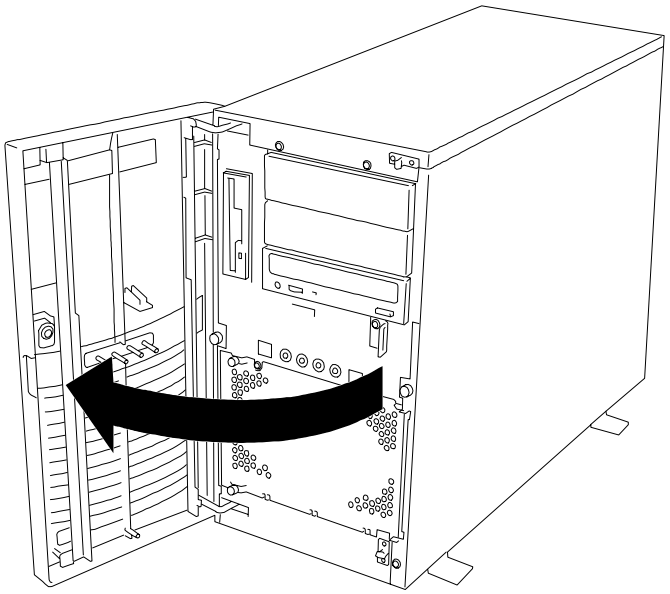
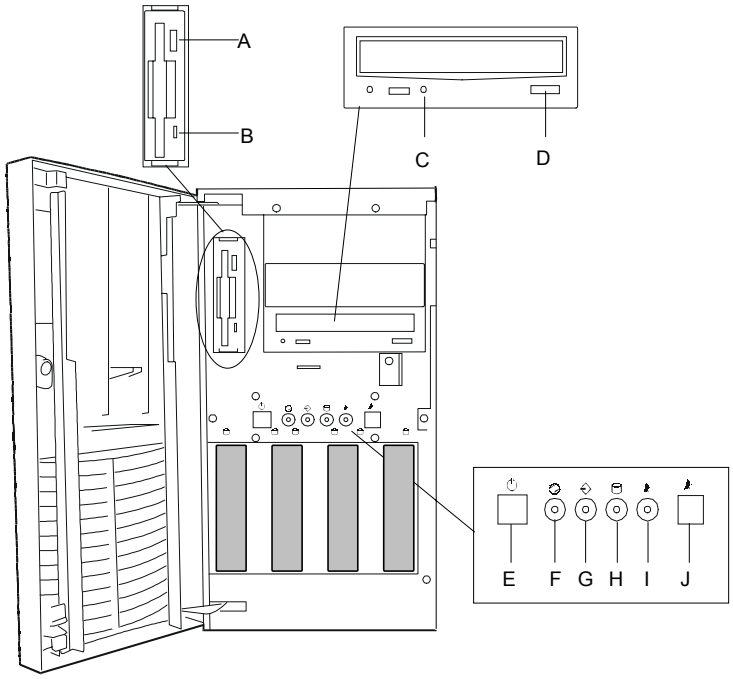


Figure 2-4. Opening the Front Door

Front View (Non-Hot-Swap SCSI Drive Bays)

Figure 2-5 shows the location of the front system controls and indicators on a system that includes the standard SCSI disk drive bays.

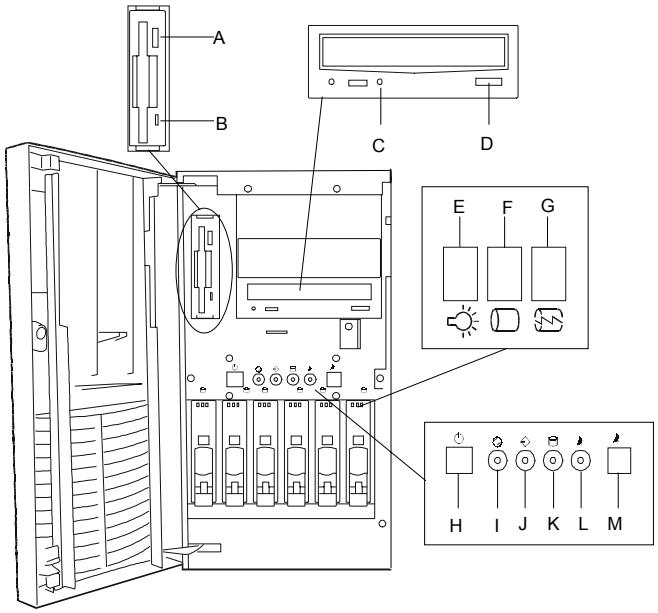


A.	Eject button, 3 ½-inch diskette drive	Press to eject diskette.
B.	Activity light, 3 ½-inch diskette drive	When lit, diskette is in use.
C.	Activity light, CD-ROM reader	When lit, CD-ROM reader is in use.
D.	Load/eject button, CD-ROM reader	Press to load CD and eject CD.
E.	DC power ON/OFF Button	Press to turn system DC power on or off.
F.	DC Power ON/OFF LED	When green, power is present in system. When off, power is turned off, power source is disrupted, or system is in the sleep mode. See Table 2-1 for a list and description of the system LEDs.
G.	Intrusion LED	When OFF, the system is OK. See Table 2-1 for a list and description of the system LEDs.
H.	Disk Fault LED	Non-functional on systems that include the standard SCSI disk drive bays.
I.	Sleep Status LED	When lit, system is in Sleep Mode. See Table 2-1 for a list and description of the system LEDs.
J.	Sleep Button	Press to enter power saving (sleep) mode. Press again to enter normal mode of operation. This function requires a corresponding operating system.

Figure 2-6. Front System Features and Controls (Non-Hot-Swap Bays)

Front View (Hot-Swap SCSI Drive Bays)

Figure 2-6 shows the location of the front system controls and indicators on a system that includes the hot-swap SCSI disk drive bays.



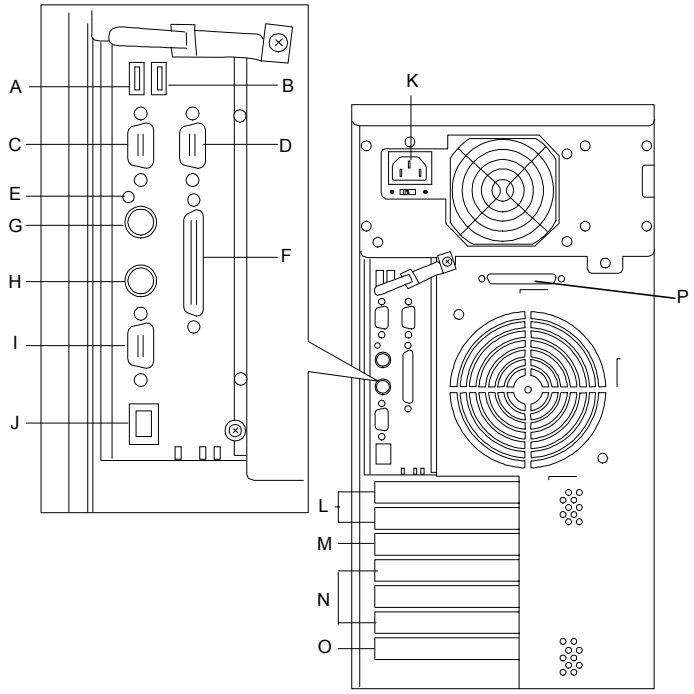
A.	Eject button, 3 ½-inch diskette drive	Press to eject diskette.
B.	Activity light, 3 ½-inch diskette drive	When lit, diskette is in use.
C.	Activity light, CD-ROM reader	When lit, CD-ROM reader is in use.
D.	Load/eject button, CD-ROM reader	Press to load CD and eject CD.
E.	Drive Present LED	When green, drive is present. See Table 2-2.
F.	Drive Activity LED	When green, Drive is active. See Table 2-2.
G.	Drive Status LED	*Indicates drive failure. See Table 2-2.
H.	DC power ON/OFF Button	Press to turn system DC power on or off.
I.	DC Power ON/OFF LED	When green, power is present in system. When off, power is turned off, power source is disrupted, or system is in the sleep mode. See Table 2-1 for a list and description of the system LEDs.
J.	Intrusion Indicator LED	When OFF, the system is OK. See Table 2-1 for a list and description of the system LEDs.
K.	Disk Fault LED	When lit, a disk drive fault occurred. See Table 2-1 for a list and description of the system LEDs.
L.	Sleep Status LED	When lit, system is in Sleep Mode. See Table 2-1 for a list and description of the system LEDs.
M.	Sleep Button	Press to enter power saving (sleep) mode. Press again to enter normal mode of operation. This function requires a corresponding operating system.

*Disk array configuration only.

Figure 2-6. Front System Features and Controls (Hot-Swap Bays)

Rear View

Figure 2-7 shows the location of the rear system features and controls.



A.	USB2 connector	Second USB connector (Black)
B.	USB1 connector	First USB connector (Black)
C.	Serial Port B	COM2 serial port 9-pin connector (Turquoise)
D.	Serial Port A	COM1 serial port 9-pin connector (Turquoise)
E.	Dump button	Reserved for debug
F.	Printer port (Burgundy)	Parallel port 25-pin connector (Burgundy)
G.	Keyboard port	PS/2-compatible 6-pin mini-DIN connector (Purple)
H.	Mouse port	PS/2-compatible 6-pin mini-DIN connector (Green)
I.	SVGA connector	SVGA monitor 15-pin connector (Blue)
J.	LAN connector	RJ-45 Ethernet connector
K.	AC input power connector	Supplies AC power to the power supply.
L.	66 MHz, 64-bit PCI Slots	Two 66 MHz, 64-bit PCI add-in board slot locations
M.	33 MHz, 64-bit PCI Slot	One 33 MHz, 64-bit PCI add-in board slot location
N.	33 MHz, 32-bit PCI Slots	Three 33 MHz, 32-bit PCI add-in board slot locations
O.	Combo PCI/ISA slot	One shared PCI or ISA add-in board slot location
P.	Wide Ultra 2 SCSI Connector	Connects to External SCSI Devices

Figure 2-7. Rear Features and Controls

Status LED Indicator Descriptions

Table 2-1 lists the system status LED indicators along with a description of each LED indicator. Table 2-2 lists the disk drive status LED panel indicators along with a description of each LED indicator. Refer to Figures 2-5 and 2-6 for the location of the LED indicators listed in Tables 2-1 and 2-2.

Table 2-1. System Status LED Indicators

LED	Status	Description	Response
DC Power Status	Off	Power OFF	None required (normal)
	Green	Power ON	None required (normal)
Intrusion	Off	No intrusion	None required (normal)
	Flashing Amber	Chassis Intrusion	Check condition
*Disk Fault	Off	No disk fault	None required (normal)
	Amber	Internal disk drive failure	Check disk drive status LEDs
Sleep Status	Off	System in Normal mode	None required (normal)
	Amber	**System power saving (sleep) mode.	Press Sleep button to return to Normal mode.

*Hot-swap chassis and disk array configuration only.
**This function requires specific operating system support.

Table 2-2. *Disk Drive Status LED Panel Indicators

LED	Status	Description	Response
Disk Drive Present	Off	Disk drive not present	None required (normal)
	Green	Disk drive present	None required (normal)
Disk Drive Activity	Off	Not accessing disk drive	None required (normal)
	Green	Accessing disk drive	None required (normal)
**Disk Drive Status	Off	No alarms	None required (normal)
	Amber (Steady light)	Disk drive failure	Replace disk drive
	(Flashing light)	Rebuilding data (in disk array configuration only)	None required (normal)

* Hot-swap disk drive cage only. See Figure 2-6.
** Disk array configuration only

Making Connections

If your system normally operates without a video display or keyboard (for example, as a network server), you must install a video display and keyboard to configure the system. You may remove them after running the BIOS Setup Utility. For information on running the BIOS Setup Utility, refer to Chapter 3 "Configuring Your System" of this User's Guide.

Refer to the previous figure (Rear Features and Controls) and connect your keyboard, monitor, and mouse. Connect any external peripheral devices such as a printer or modem by following the instructions included with these devices.

⚠ CAUTION

Damage to the system may result if the keyboard/mouse cable is inserted or removed when power is applied to the system.

Inserting a telephone line connector into a LAN board RJ-45 port may result in personal injury and equipment damage.

Setting the Line Voltage

The system contains an ATX300 watt power supply that is switch-selectable for 115 or 230 VAC at an operating frequency of 50/60Hz. The power supply voltage selection switch is factory set to 115Vac for systems shipped to North America; it is set to 230Vac for systems shipped in Europe. Line source voltages between 200 and 240 VAC are acceptable when the power supply input voltage is set to 230 VAC.

⚠ CAUTION

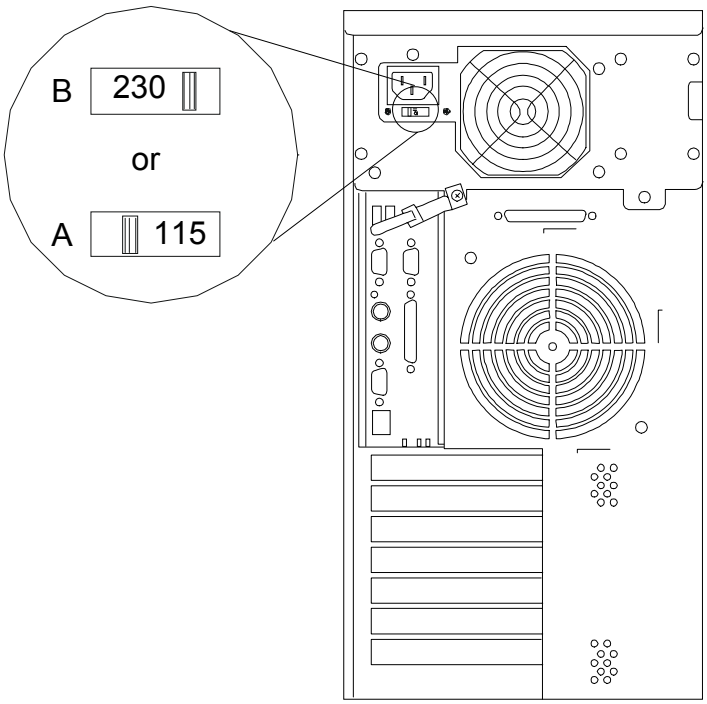
Before you plug the system power cord into an AC outlet, ensure the input line voltage setting for the power supply is correct.

To use the system with line source voltages between 200 and 240 VAC, the line voltage selector switch on the power supply must be set to 230. If you set the switch to the 115 VAC position, the power supply will be damaged when you plug in your system.

If you need to change the line voltage setting, perform the following steps.

Note: If you are setting up your system for the first time, the power cord will not be connected to the rear panel of your system.

1. Unplug the AC power cord from the back of the chassis.
2. Insert the tip of a small screwdriver or ballpoint pen into the depression on the line voltage selector. See Figure 2-8.
3. Slide the selector switch to 115 VAC or to 230 VAC (line source voltage range: 220 to 240 VAC).



A. Voltage selector switch set to 115 VAC

B. Voltage selector switch set to 230 VAC

Figure 2-8. Setting the Line Voltage

Connecting the Power Cord

Plug the female end of the AC power cord into the input receptacle on the rear of the power supply cage. Plug the male end of the power cord into NEMA 5-15R outlet for 100-120 VAC or NEMA 6-15R outlet for 200-240 VAC.

If the power cord supplied with the system is not compatible with the AC wall outlet in your region, obtain a suitable power cord that meets the following criteria.

- The power cord must be rated for the available AC voltage and have a current rating that is at least 125% of the current rating of the system.
- The power cord connector that plugs into the wall outlet must be terminated in a grounding-type male plug designed for use in your region. It must have certification marks showing certification by an agency acceptable in your region.
- The power cord connector that plugs into the system must be an IEC- type CEE-22 female connector.
- The power cord must be less than 1.8 meters (6.0 feet) long.

When connecting the power cord to a power control unit such as an UPS, confirm that the power control unit is powered OFF. Connecting the power cord while power is supplied to the power control unit may cause a failure.

⚠ WARNING

Your system shipped with a power cord for the power supply. Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.

Powering On Your System

Power on your system as follows.

1. Make sure all external devices, such as a video display, keyboard, and mouse (optional) have been connected, and the power cords are connected.
2. Power on the video display and any other external devices.
3. Open the front door and press the push-button power on/off switch on the front panel. Verify that the system power-on LED is lit. If it is not lit, ensure the ac power cord is connected to a functional ac power source.

After a few seconds your system begins the internal Power-On Self Tests (POST). POST automatically checks the system board, CPU module, memory, keyboard, and most installed peripheral devices.

⚠ CAUTION

Always allow POST to complete before powering down your system.

⚠ CAUTION

The server management logic on your system board monitors and logs system voltage changes. When powering down your system you may experience a 1–5 second delay from the time you press the push-button power on/off switch on the front panel and your system powering down. This is normal system operation and is required by the server management logic.

If you have problems powering on your system, refer to *Problem Solving* in Chapter 5 of this User's Guide.

After you have successfully powered on your system, insert the ExpressBuilder CD-ROM into the CD-ROM device, reboot the system and follow the screen prompts to run ExpressBuilder.

3

Configuring Your System

- Configuring Your System
- BIOS Setup Utility
- Adaptec SCSI Utility
- Configuring the RAID Controller
- Configuring System Board Jumpers

Configuring Your System

Configuration and setup utilities are used to change your system configuration. You can configure your system, as well as option boards you may add to your system, using the BIOS Setup Utility. Several unique system parameters are configured using the BIOS Setup, which is stored in the system FLASH memory.

The Adaptec Configuration Utility detects the SCSI host adapters on the system board. Use this utility if you need to configure the two SCSI controllers in your system or to perform a SCSI disk format or verify disk operation on the SCSI disk drives. The Adaptec Configuration Utility is also used to configure any SCSI removable media devices installed in your system.

If your system has been factory configured, the BIOS Setup or Adaptec Configuration Utility do not need to be run unless you want to change the password or security features, add certain types of option boards or devices, or upgrade your system board.

This chapter also provides information on several system configuration parameters that are set by jumpers on the system board. However, these parameters do not usually require change.

Use the EXPRESSBUILDER CD-ROM to create the device driver diskettes.

BIOS Setup Utility

The BIOS Setup Utility is used to change system configuration parameters. The utility is resident in the system FLASH memory and does not require a diskette or an operating system present to run.

Using the BIOS Setup Utility

You access the BIOS Setup utility when you turn on or reboot your system. To run the BIOS Setup Utility, perform the following procedure:

1. Power-on or reboot the system. "Press <F2> to enter SETUP" displays.
2. Press **F2**. The BIOS Setup Utility starts and the Main Menu is displayed. The menu bar at the top of the Main Menu lists the following selections:

Menu	Use
Main	Use this menu for basic system configuration.
Advanced	Use this menu for setting the Advanced Features available on your system.
Security	Use this menu to set User and Supervisor Passwords and the Backup and Virus-Check reminders.
System Hardware	Use this menu for configuring unique Server features.
Boot	Use this menu to configure Boot Device priority.
Exit	Exits the current menu.

Use the arrow keys to select a menu or an item on a displayed menu. Press the value keys (listed in the table below) to cycle through the allowable values for the selected field. Use the Exit menu's "Save Values" selection to save the current values on all the menus.

To display a submenu, position the cursor on a selection that has a submenu and press **ENTER**. An arrow precedes selections with submenus.

Refer to the following table for information on the keys that you use with BIOS Setup. These keys are also listed at the bottom of the Setup menu.

Key	Function in Setup Menu
F1 or Alt-H	Get Help about an item.
ESC	Exit the current menu and return to the previous menu.
Left or right arrow keys	Move between menus.
Up or down arrow keys	Move cursor up and down. The cursor moves only to the settings that you can change.
HOME or END	Move cursor to top or bottom of window.
PAGE UP or PAGE DOWN	Move cursor to next or previous page.
F5 or -	Select the previous value for the field.
F6 or + or SPACE	Select the next value for the field.
F9	Load default configuration values for this menu.
F10	Save configuration values and exit.
ENTER	Execute command or Select submenu.

BIOS Setup Configuration Settings

The BIOS Setup Configurations tables show the default settings for the BIOS Setup Utility and provides a place for you to record any changes you make to these settings. Recommended values are bold in the following tables.

Main Menu

Feature	Choices or Display Only	Description	Your Setting
Processor Type	————————	(Display Only). Shows the type of processor installed.	
Processor Speed	XXX	(Display Only). Indicates the processor speed.	
Cache RAM	XXX KB	(Display Only). Indicates the cache RAM size.	
System Memory	XXX KB	(Display Only). Indicates the total capacity of the basic memory.	
Extended Memory	XXXXXX KB	(Display Only). Indicates the total capacity of the extended memory.	
Language	**English (US)** French, German Spanish, Italian	Selects which language BIOS displays. Note: This feature *immediately* changes to the language BIOS selected.	
BIOS Version	————————	(Display Only). Indicates the version of the system BIOS.	
System Time	HH:MM:SS	Sets the system time (hour, minutes, seconds, on 24 hour clock).	
System Date	MM/DD/YYYY	Sets the system date (month, day, year).	
Diskette A	1.44/1.25 MB 3.5"	Selects the diskette type. Note that 1.25 MB, 3.5 inch references a 1024 byte/sector Japanese media format. To support this type of media format requires a 3.5 inch 3-mode diskette drive.	

Advanced Menu

Feature	Description	Your Setting
Advanced	Refer to Advanced Submenu.	
Memory Reconfiguration	Refer to Memory Reconfiguration Submenu.	
CPU Reconfiguration	Refer to CPU Reconfiguration Submenu.	
Peripheral Configuration	Refer to Peripheral Reconfiguration Submenu.	
Monitoring Configuration	Refer to Monitoring Configuration Submenu. It sets POST Monitoring and Boot Monitoring.	
PCI Device	Refer to PCI Device Submenu.	
Option ROM	Refer to Option ROM Submenu. It Disables/Enables the Option ROM BIOS on the PCI Bus.	
ISA Device	Refer to ISA Device Submenu.	
Numlock	Refer to Numlock Submenu. It selects Keyboard Options.	

Advanced Submenu

Feature	Choices or Display Only	Description	Your Setting
Installed O/S	**Other** PnP O/S	Select the operating system installed on your system that will be used most of the time. Note: An incorrect setting can cause some operating systems to display unexpected behavior.	
Reset Configuration Data	**No** Yes	Select Yes if you want to clear the Extended System Configuration Data (ESCD) area.	
Boot-time Diagnostic Screen	**Disabled** Enabled	Disables or enables display of the diagnostic screen during boot instead of the NEC logo. The Boot-time diagnostic screen is automatically enabled if redirection or RomPilot is enabled.	
RomPilot Support	**Disabled** Enabled	Disables or enables RomPilot support. The Boot-time diagnostic screen is enabled if RomPilot is enabled. (See Appendix B for more details.)	

Memory Reconfiguration Submenu

Feature	Choices or Display Only	Description	Your Setting
DIMM #1 Status	Normal*	(Display Only)	
DIMM #2 Status	Normal*	(Display Only)	
DIMM #3 Status	Normal*	(Display Only)	
DIMM #4 Status	Normal*	(Display Only)	
Clear DIMM Errors	Press **ENTER**	Clears the DIMM group error status information.	
DIMM Error Pause	**Enabled** Disabled	The POST operation pauses if a DIMM error occurs.	

*Possible Values: Normal, None, or Error.

CPU Reconfiguration Submenu

Feature	Choices or Display Only	Description	Your Setting
CPU #1 Status	Normal*	(Display Only)	
CPU #2 Status	Normal*	(Display Only)	
Clear CPU Errors	Press **ENTER**	Clears the CPU error information.	
CPU Error Pause	**Enabled** Disabled	The POST operation pauses if a CPU error occurs.	

*Possible Values: Normal, None, or Error.

Peripheral Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
Serial Port 1: (COM 1)	Disabled 3F8, IRQ3 **3F8, IRQ4** 2F8, IRQ3 2F8, IRQ4 3E8, IRQ3 3E8, IRQ4 2E8, IRQ3 2E8, IRQ4 Auto	Disables serial port 1 or selects the base address and interrupt (IRQ) for serial port 1.	
Serial Port 2: (COM 2)	Disabled 3F8, IRQ3 3F8, IRQ4 **2F8, IRQ3** 2F8, IRQ4 3E8, IRQ3 3E8, IRQ4 2E8, IRQ3 2E8, IRQ4 Auto	Disables serial port 2 or selects the base address and interrupt (IRQ) for serial port 2.	
Parallel Port	Disabled 378, IRQ5 **378, IRQ7** 278, IRQ5 278, IRQ7 3BC, IRQ5 3BC, IRQ7 Auto	Disables the parallel port or selects the base address and interrupt (IRQ) for the Parallel port.	
Parallel Mode	Output only Bi-directional EPP ECP, DMA1 **ECP, DMA3**	Selects the parallel port operation mode.	
Diskette Controller	Disabled **Enabled**	Configure using these options: (Disabled) No configuration. (Enabled) User configuration	
Mouse	Disabled Enabled **Auto Detect**	*Disabled* prevents any installed PS/2 mouse from functioning, but frees up IRQ12. *Enabled* forces the PS/2 mouse port to be enabled regardless if a mouse is present. *Auto Detect* enables the PS/2 mouse only if present. *OS Controlled* is displayed only if the OS controls the mouse.	
SCSI Controller	Disabled **Enabled**	Disables or enables on-board SCSI controller.	
LAN Controller	Disabled **Enabled**	Disables or enables on-board LAN controller.	
USB Controller	**Disabled** Enabled	Disables or enables on-board USB controller.	

Monitoring Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
POST Monitoring	Disabled OptROM-END **POST-END**	Selects the point where the POST monitoring checkpoint is.	
Boot Monitoring	**Disabled** Enabled	Disable or enable the boot monitoring feature.	

PCI Device Submenu

Feature	Choices or Display Only	Description	Your Setting
PCI IRQ1 — PCI IRQ14	Disabled **Auto Select** IRQ3 IRQ4 IRQ5 IRQ6 IRQ7 IRQ9 IRQ10 IRQ11 IRQ12	PCI devices use hardware interrupts called IRQs. A PCI device cannot use IRQs already in use by ISA devices. Use"Auto" only if no ISA legacy cards are installed.	

Option ROM Submenu

Feature	Choices or Display Only	Description	Your Setting
Onboard SCSI	**Enabled** Disabled	Disables/Enables the mapping of the onboard SCSI BIOS.	
Onboard LAN	**Enabled** Disabled	Disables/Enables the mapping of the onboard LAN BIOS	
PCI Slot 1	**Enabled** Disabled	Initializes Device Expansion ROM	
PCI Slot 2	**Enabled** Disabled	Initializes Device Expansion ROM	
PCI Slot 3	**Enabled** Disabled	Initializes Device Expansion ROM	
PCI Slot 4	**Enabled** Disabled	Initializes Device Expansion ROM	
PCI Slot 5	**Enabled** Disabled	Initializes Device Expansion ROM	
PCI Slot 6	**Enabled** Disabled	Initializes Device Expansion ROM	
PCI Slot 7	**Enabled** Disabled	Initializes Device Expansion ROM	

ISA Device Submenu

Feature	Choices or Display Only	Description	Your Setting
IRQ #1	**None** IRQ3 IRQ4 IRQ5 IRQ6 IRQ7 IRQ9 IRQ10 IRQ11 IRQ12	Reserves specific IRQs for use by legacy ISA devices.	
IRQ #2	Same as above.		
DMA Channel #1	**None** DMA 0 DMA 1 DMA 2 DMA 3 DMA 4 DMA 5 DMA 6 DMA 7	Reserves specific DMA channels for use by legacy ISA devices.	
DMA Channel #2	Same as above.		
I/O Port Address #1	0	Select I/O port base address. Reserved 16 byte. (110 - 3F0, 0 = None)	
I/O Port Address #2	0	Same as above.	
I/O Port Address #3	0	Same as above.	
I/O Port Address #4	0	Same as above.	
Memory Size	**None** 16 32 48 64 80 96	Reserves specific memory for use by legacy ISA devices.	
Memory Address	**None** C800h CC00h D000h D400h D800h DC00h	Select memory base address.	

Numlock Submenu

Feature	Choices or Display Only	Description	Your Setting
Numlock	**Auto** On OFF	Selects the power-on state for Numlock.	
Key Click	**Disabled** Enabled	Disables or enables keyclick.	
Keyboard Auto-repeat Rate	2/sec 6/sec **10/sec** 13.3/sec 18.5/sec 21.8/sec 26.7/sec 30/sec	Selects key repeat rate.	
Keyboard Auto-repeat Delay	0.25 sec 0.5 sec 0.75 sec **1 sec**	Selects delay before key repeat.	

Security Menu

> ***Note:*** Enabling the Supervisor Password field requires a password for entering Setup. The passwords are not case sensitive.

Feature	Choices or Display Only	Description	Your Setting
Supervisor Password is	**Clear**	Status only, user cannot modify. Once set, this can be disabled by setting it to a null string, or by clearing password jumper on system board (see System Board Jumpers in this Chapter).	
User Password is	**Clear**	Status only, user cannot modify. Once set, this can be disabled by setting it to a null string, or by clearing password jumper on system board (see System Board Jumpers in this Chapter).	
Set Supervisor Password	Press **ENTER**	Supervisor password controls access to the setup utility. When the <Enter> key is pressed, the user is prompted for a password; press ESC key to abort. Once set, this can be disabled by setting it to a null string, or by clearing password jumper on system board (refer to System Board Jumpers in this chapter).	
Set User Password	Press **ENTER**	When the <Enter> key is pressed, the user is prompted for a password; press ESC key to abort. Once set, this can be disabled by setting it to a null string, or by clearing password jumper on system board (refer to System Board Jumpers in this chapter).	
Password on Boot	**Disabled** Enabled	Disables or enables password entry on boot.	
Diskette Access Secure Mode	**Everyone** Supervisor	Controls access to diskette drives.	
Power Switch Mask	Masked **Unmasked**	Determines whether power switch is masked or unmasked.	
Option ROM Menu Mask	**Unmasked** Masked	Determines whether Option ROM Menu Mask is masked or unmasked.	
Processor Serial Number	**Disabled** Enabled	Determines whether Processor Serial Number feature is enabled or disabled.	

System Hardware Menu

Feature	Choices or Display Only	Description	Your Setting
Thermal Sensor		Refer to Thermal Sensor Submenu.	
Wake On Events		Refer to Wake On Events Submenu.	
AC Link	Power On **Last State** Stay Off	Determines the mode of AC Link.	
ESM IRQ	Disabled IRQ5 IRQ10 **IRQ11**	Determines routing of the ESM interrupt.	
Error Log Initialization	Press **Enter**	Request to initialize the Error Log now. If *Clear OK*, then display "System Event Log Cleared!" If *Clear NG*, then display "System Event Log Not Cleared!"	
Console Redirection		Additional setup menu to configure console. The Boot-Time diagnostic screen is enabled if redirection is enabled.	

Thermal Sensor Submenu

Feature	Choices or Display Only	Description	Your Setting
Thermal Sensor	**Enabled** Disabled	When enabled determines if the BIOS will disable boot (if temperature is not within a safe range).	
Upper Limit	50	Sets the upper temperature limit in centigrade.	
Lower Limit	5	Sets the lower temperature limit in centigrade.	

Wake On Events Submenu

Feature	Choices or Display Only	Description	Your Setting
Wake On LAN	**Enabled** Disabled	Enables Wake ON LAN support.	
Wake On Ring	**Enabled** Disabled	Enables Wake ON Ring support.	

Console Redirection Submenu

Feature	Choices or Display Only	Description	Your Setting
Serial Port Address	**Disabled** Serial Port 2 (3F8h/IRQ4) Serial Port 2 (2F8h/IRQ3)	If enabled, the console will be redirected to this port. If console redirection is enabled, this address must match the settings of serial port 2.	
Baud Rate	57.6K **19.2K**	Enables the specified baud rate.	
Flow Control	No Flow Control **XON/OFF**	Enables flow control.	
Console Connection	**Direct** Via Modem	Indicate whether the console is connected directly to the system or a modem is used to connect.	

Boot Menu

Use the up or down arrow keys to select a device, then press the <+> or <-> keys to move the device higher or lower in the boot priority list.

Boot Device Priority Menu

Boot Priority	Device	Description	Your Setting
1.	ATAPI CD-ROM Drive	Attempts to boot from an ATAPI CD-ROM drive.	
2.	Diskette Drive	Attempts to boot from a diskette drive.	
3.	Hard Drive	Attempts to boot from a hard drive device.	
4.	Intel UNDI, PXE-2.0 (Build 071)	Attempts to boot from diagnostic boot partition of the flash memory.	

Exit Menu

You can make the following selections on the Exit Menu. Select an option using the up or down arrow keys, then press <Enter> to execute the option. Pressing <Esc> does not exit this menu. You must select one of the items from the menu or menu bar to exit.

Exit Menu

Choices	Description
Save Changes and Exit	Exits System Setup after saving all changes to CMOS.
Exit Without Saving Changes	Exits System Setup without saving setup data to CMOS.
Get Default Value	Loads default values for all Setup items.
Load Previous Values	Loads previous values of all Setup items.
Save Changes	Writes all Setup item values to CMOS.

Adaptec SCSI Utility

The Adaptec SCSI Utility detects the SCSI host adapters on the server board.

Use the Adaptec SCSI Utility to:

- Change default values
- Check and/or change SCSI device settings that may conflict with those of other devices in the server

Running the SCSI Utility

You access the Adaptec SCSI Utility when you turn on or reboot your system.

To run the Adaptec SCSI utility, perform the following procedure:

1. Power-on or reboot the system.
2. When this message appears on the video monitor:

 Press Ctrl-A to run SCSI Utility...

3. Press **Ctrl+A** to run this utility. When it appears, choose the host adapter that you want to configure.
4. The SCSI utility starts. When the Adaptec SCSI Utility detects more than one AIC-78xx host adapter, it displays a selection menu listing the bus and device number of each adapter. When the selection menu appears, select the channel you wish to configure as follows:

Bus : Device : Channel	Selected SCSI Adapter
01 : 04 : A*	AIC7899
01 : 04 : B	AIC7899

*Internal SCSI connector.

5. Once you select the adapter, the following screen is displayed:

Menu	Description
Configure/View Host Adapter Settings	Configure host adapter and device settings.
SCSI Disk Utilities	The utility scans the SCSI bus for SCSI devices, reports a description of each device. Run these utilities *before* configuring SCSI devices.

6. If you wish to format a disk, verify disk media, or display a list of devices and their SCSI IDs, select “SCSI Disk Utilities”. If you wish to configure the adapter or a device, select “Configure/View Host Adapter Settings”.

Adaptec SCSI Utility Configuration Settings

The following keys are active for all Adaptec SCSI Utility screens:

Key	Action
Arrows	Up and down arrows move from one parameter to another within a screen.
ENTER	Displays options for a configurable parameter. Selects an option.
ESC	Moves back to previous screen or parameter or EXIT if at the Main menu.
F5	Switches between color and monochrome.
F6	Resets to host adapter defaults.

The Table 3-1 shows the normal settings for the Adaptec SCSI Utility and provides a place for you to record any changes you make to these settings.

Table 3-1. Adaptec SCSI Utility Setup Configurations

OPTION	RECOMMENDED SETTING OR DISPLAY ONLY	YOUR CONFIGURATION
SCSI Bus Interface Definitions		
Host Adapter SCSI ID	7	
SCSI Parity Checking	Enabled	
Host Adapter SCSI Termination	Enabled	
Additional Options		
Boot Device Options	Press ENTER for menu	
Boot Channel	A First	
Boot SCSI ID	0	
Boot LUN Number	0	
SCSI Device Configuration	Press ENTER for menu	
Sync Transfer Rate (MB/Sec)	160	
Initiate Wide Negotiation	Yes	
Enable Disconnection	Yes	
Send Start Unit Command	Yes	
Enable Write Back Cache	No	
BIOS Multiple LUN Support	No [1]	
Include in BIOS Scan	Yes [1]	
Advanced Configuration Options	Press ENTER for menu.	
Plug and Play SCAM Support	Disabled	
Reset SCSI Bus at IC Initialization	Enabled	

[1] No effect if BIOS is disabled.

Table 3-1. Adaptec SCSI Utility Setup Configurations (Continued)

OPTION	RECOMMENDED SETTING OR DISPLAY ONLY	YOUR CONFIGURATION
Display <Ctrl-A> Messages During BIOS Initialization	Enabled	
Extended BIOS Translation for DOS Drives >1 GByte	Enabled	
Verbose/Silent Mode	Verbose	
Host Adapter BIOS (Configuration Utility Reserves BIOS Space)	Enabled[1]	
Domain Validation	Enabled	
Support Removable Disks Under BIOS as Fixed Disks	Disabled[1, 2]	
BIOS Support for Int13 Extensions	Enabled[1]	

[1] No effect if BIOS is disabled.
[2] Do not remove media from a removable media drive if it is under BIOS control.

Exiting Adaptec SCSI Utility

To exit the Adaptec SCSI Utility, press ESC until a message prompts you to exit (if you changed any settings, you are prompted to save the changes before you exit).

Configuring the RAID Controller

The RAID (Redundant Array of Inexpensive Devices) options available for your system are the single channel SecuRAID 110 (Mylex AcceleRAID 150) RAID controller board and the three channel SecuRAID 530 (Mylex eXtremeRAID 1100) RAID controller board, which gives your system the added security of fault tolerance.

If you order a system with a RAID controller, the system is pre-configured at the factory according to Table 3-2.

Table 3-2. RAID Configurations

Number of Hard Drives	RAID Level Configured	Hard Drives in Array	Description
1	7	1	**JBOD (RAID 7)** Known as *Just a Bunch of Drives*, JBOD allows the controller to access the drives independently. This configuration has no redundancy and does not use striping.
2	1	2	**Mirroring (RAID 1)** Drives are paired and mirrored. All data is 100% duplicated on an equivalent drive (fully redundant).
3	5	3	**Striping with Parity (RAID 5)** Data is striped across several physical drives. Parity protection is used for data redundancy.
4 or more	5	4 (one standby drive)	**Striping with Parity (RAID 5) with a standby drive** The array consists of three ON-LINE drives and one STANDBY drive. The standby replacement drive, or hot spare, is one of the most important features RAID provides to achieve automatic, non-stop service with a high degree of fault-tolerance.

If you want to change the RAID level or add additional hard disks to the array, use the RAID configuration utility. The RAID configuration utility is included with a RAID controller.

If you are adding the RAID controller to an existing system, the RAID configuration utility allows you to configure your disk array before reinstalling your network operating system. The RAID controllers support various versions of RAID technology (referred to as RAID levels). To use any RAID level, you must configure the RAID controller using the RAID configuration utility prior to installing your Network Operating System. For an explanation of this utility, refer to the documentation on the MYLEX CDROM that was shipped with the RAID controller. It describes RAID technology and provides tips on making your array perform well in your specific application. It also covers array hardware preparation, configuration, and initialization. After completing the steps in the manual, you can install your Network Operating System.

If you want to remotely configure the array (from a PC client); increase array capacity online; or monitor statistics on disk and controller activity, you must install the array manager provided with your RAID subsystem. Increasing array capacity is covered in the user's guide shipped with the option.

Configuring System Board Jumpers

Before You Begin

Only a qualified technical person should perform the procedures in this section.

⚠ CAUTION

Electrostatic discharge (ESD) can damage the system board. Modify the system board only at an ESD workstation. Otherwise, wear an antistatic wrist strap attached to chassis ground.

The system board jumpers enable you to set specific operating parameters for your system. A jumper is a small plastic-encased conductor (shorting plug) that slips over two jumper pins.

The "System Board Jumpers" illustration (Figure 3-1) shows the location of the system board jumpers (A). Table 3-3 "System Board Jumper Configurations" lists the system board jumpers and their factory default settings.

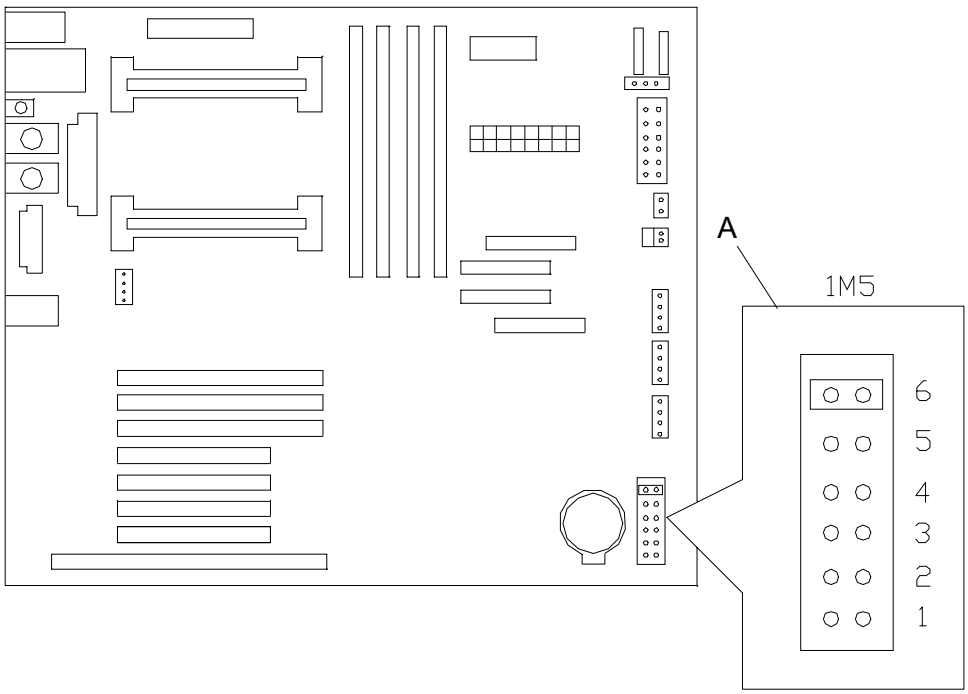


Figure 3-1. System Board Jumpers

Table 3-3. System Board Jumper Summary

Jumper	Function	Jumper On/Off	Description
1.	CMOS clear	**Off, Protect**	Preserves the contents of CMOS.
		On, Erase	Clears CMOS.
2.	Password disable	**Off, Enable**	Enables password protection.
		On, Disable	Disables the password.
3.	Reserved	**Off, Not Used**	Required. Do Not Change.
4.	Reserved	**Off, Not Used**	Required. Do Not Change.
5.	Reserved	**Off, Not Used**	Required. Do Not Change.
6.	Spare	Off, Not Used	
		On, Spare	Provides a spare jumper.

Moving System Board Jumpers

⚠ CAUTION

Before doing the procedures in this section, make sure that your system is powered off and unplug the AC power cords from the back of the chassis. Failure to disconnect power before moving the jumpers can result in personal injury and equipment damage.

Observe static precautions. Use an antistatic wrist strap.

To configure the system board options:

1. Power off the system and remove the left panel as described in Chapter 4 of this guide.
2. Check to ensure the system power cord is removed from the back of the system.
3. Locate the position of the jumpers on the system board you are changing. To change a jumper setting, use a pair of needle-nose pliers or your fingers to remove the jumper from its current location. Position the jumper over the two pins for the desired setting and press it onto the pins. Be careful not to bend the pins. Refer the System Board Summary table for system board jumper settings.
4. Install the system cover and power up the system.

Clearing and Changing the Passwords

To clear and change the passwords:

1. Power off the system and remove the left panel as described in chapter 4 of this guide.
2. Remove the spare jumper from position 6 on jumper block 1M5.
3. Reinstall the spare jumper on position 2 (Password Disable) of jumper block 1M5. Refer to the previous illustration "System Board Jumpers" to find the location of this jumper.
4. Power on the system and while waiting for POST to complete, press the F2 key to enter BIOS setup. This automatically clears all passwords, provided you exit and save the BIOS setup.
5. Power off the system.
6. Remove the Password Disable jumper from pins 3-4.
7. Replace the panel and power on the system.
8. To specify a new password run the BIOS Setup Utility as described earlier in this chapter.

4

Upgrading Your System

- General Information
- Static Precautions
- Preparing Your System for Upgrade
- Equipment Log
- Opening and Removing the Front Door
- Removing Side Panels
- Installing Side Panels
- Modifying the System Board
- Option Boards
- Installing a RAID Controller Board
- Hard Disk Drives
- Removable Media Devices

General Information

WARNING

The DC push-button on/off switch on the front panel does not turn off the system AC power. Also, +5vdc is present on the system board whenever the AC power cord is connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cord from the back of the chassis. Failure to disconnect power before opening your system can result in personal injury and equipment damage.

CAUTION

The server management logic on your system board monitors and logs system voltage changes. When powering down your system you may experience a 1–5 second delay from the time you press the push-button power on/off switch on the front panel and your system powering down. This is normal system operation and is required by the server management logic.

CAUTION

Operating your system with the side panels removed can damage your system components. For proper cooling and airflow, always replace the side panels before powering on your system.

Note: Your system error log will be lost, if your system ac power source is off or disconnected.

Contact your sales representative or dealer for a list of approved optional peripheral devices.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Preparing Your System for Upgrade

Depending on the upgrade, you will need one or more of the following tools:

- Phillips screwdriver (#1 bit and #2 bit)
- Flat-head screwdriver
- Small needle nose pliers
- Pen or pencil
- ESD workstation or antistatic wrist strap (recommended)

Equipment Log

Use the equipment log form located at the end of this manual to record the model and serial number of your system, all installed options, and any other pertinent information specific to your system. You will need this information when configuring your system.

Opening and Removing the Front Door

You must open the front door to remove the side panels on your system. Perform this procedure to open and remove the front door.

1. Power off the system and ensure the power cord is unplugged from the AC wall outlet.
2. If the front door is locked, unlock it.
3. Grasp the indentation located on the right edge of the front door and pull the door towards you to open it (Figure 4-1).

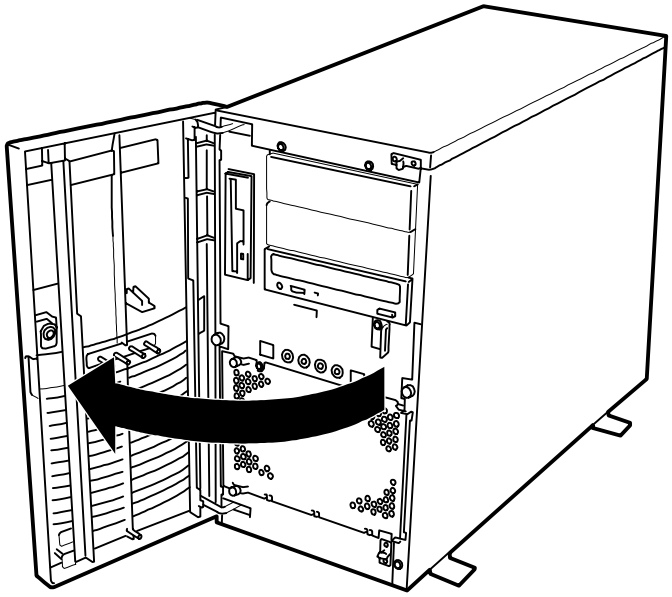


Figure 4-1. Opening the Front Door

4. To remove the front door, open it and lift the door and pull it towards you (see Figure 4-2). The mounting pins of the front door are disengaged from their mounting holes on the front of the system.

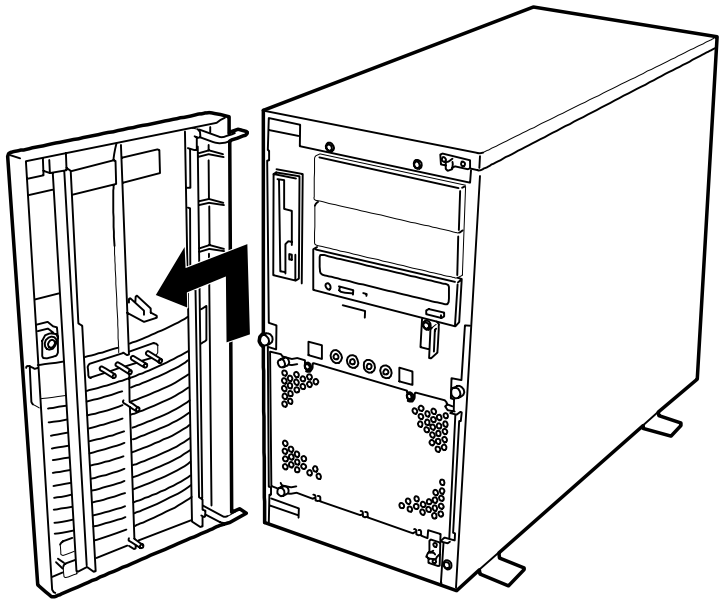


Figure 4-2. Removing the Front Door

To install the front door:

1. Position the front door so the mounting pins of the front door are aligned with their mounting holes on the front of the system. Slide the lower mounting pin into its mounting hole and then slide in the upper pin.
2. Close the front door.

Removing Side Panels

To install options in your system, you must remove the side panel on the left side of the system (as viewed from the front). The side panel on the right side of the system (as viewed from the front) only has to be removed when adding SCSI hard disk drives to the non-hot-swap drive bays.

⚠ CAUTION

For proper cooling and airflow, do not operate the system with the side panels removed. Always replace the panels before powering on the system.

⚠ WARNING

If you are removing the side panel after the system is set up, you must first power off the system and all external devices and then **Unplug** the system power cord

To remove the **left** side panel:

1. Power off the system and ensure it is disconnected from the ac wall outlet.
2. Open the front door following procedures in the previous section.
3. The left side panel is secured to the chassis with one thumbscrew (Figure 4-3A). Remove the screw securing the side panel. Save the screw for reattaching the side panel.
4. Using the indentation on the side of the panel, slide the side panel toward the front of the system. This unlocks the locking fingers behind the side panel.
5. Pull the side panel out and away from the chassis (Figure 4-3).

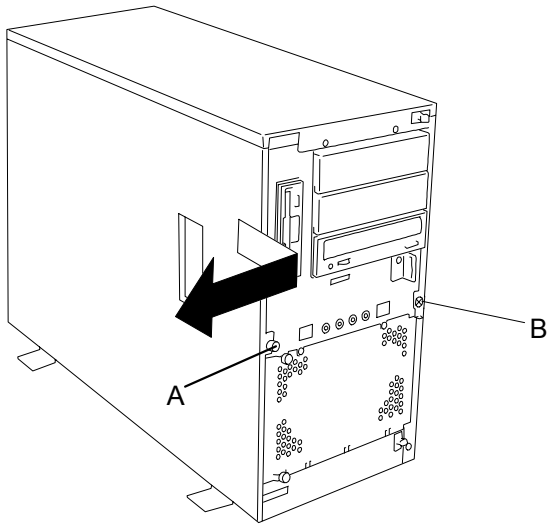


Figure 4-3. Removing the Left Side Panel

To remove the **right** side panel:

1. Power off the system and ensure it is disconnected from the ac wall outlet.
2. Open the front door following procedures described earlier in this chapter.
3. The right side panel is secured to the chassis with one Phillips head screw (Figure 4-3B). Remove the screw securing the side panel. Save the screw for reattaching the side panel.
4. Using the indentation on the side of the panel, slide the side panel toward the front of the system. This unlocks the locking fingers behind the side panel.
5. Pull the side panel out and away from the chassis

Installing Side Panels

1. Before replacing the side panel, make sure no tools or loose parts have been left inside the system chassis.
2. Make sure all option boards are firmly seated in their respective slots and that all interior cables are properly connected.
3. Insert the metal tabs on the top and bottom of the side panel into their slots on the chassis. Slide the side panel rearward as far as it will go.
4. Replace the side panel retaining screw (see Figure 4-4).

> ***Note:*** If your system is already set up, plug the system back in, reconnect the peripherals, and power on the peripherals and system.

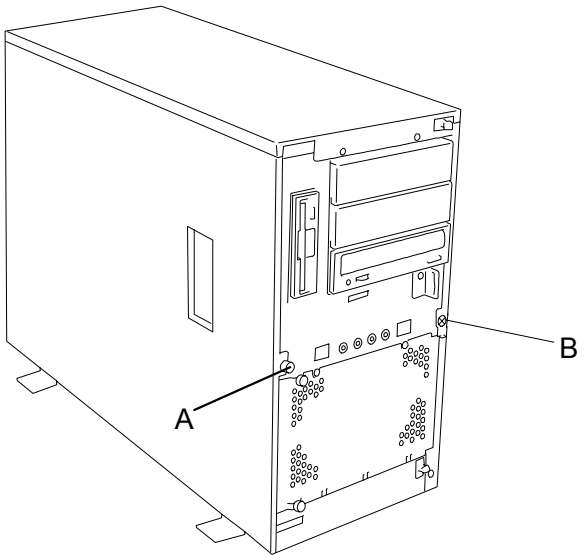


Figure 4-4. Securing a Side Panel

Modifying the System Board

The following sections provide procedures for upgrading and configuring the system board in your system. Topics covered include:

- Replacing the real-time clock battery
- Removing and Installing a Pentium processor
- Installing or removing DIMMs.

⚠ CAUTION

Electrostatic discharge (ESD) can damage add-in boards and other components; place them on an antistatic surface. Modify the system board only at an ESD workstation. Otherwise, wear an antistatic wrist strap attached to chassis ground.

Replacing the Real-time Clock Battery

You may need to replace the real-time clock battery because of its life span. The battery (Vendor Part #CR2450) is a commodity part available through many vendors. Notice the plus (+) sign on the battery. This sign will assist you in correctly positioning the battery on the system board.

⚠ CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by manufacturer. Dispose of lithium batteries as required by local ordinance or as normal waste if no local ordinance exists. Do not expose the component to excessive heat or fire. Keep all batteries away from children

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap.

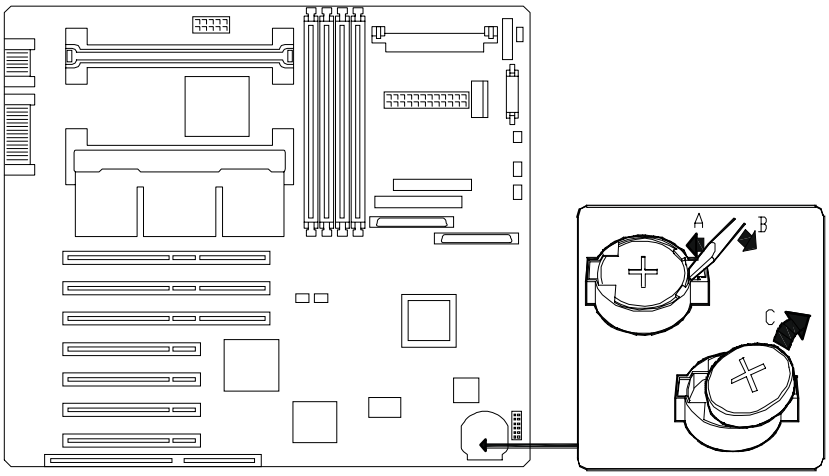


Figure 4-5. Replacing the Real-Time Clock Battery

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open the front door.
3. Remove the left side panel as described earlier in this chapter.
4. If present, remove the protective plastic cover located over the top of the lithium battery.
5. Insert the tip of a small flat-bladed screwdriver, or equivalent, under the plastic tab on the San-in plastic retainer.
6. Gently push down on the screwdriver to lift the battery (Figure 4-5B).
7. Remove the battery from its socket (Figure 4-5C).
8. Dispose of the battery according to local ordinance.
9. Remove the new lithium battery from its package, and, being careful to observe the correct polarity, insert it in the battery socket.
10. If applicable, reinstall the plastic cover on the lithium battery socket.
11. Replace the side panel, plug in the system power cord, and turn on the system.
12. Run the BIOS Setup to restore the configuration settings to the real-time clock.

Removing and Installing a Pentium III Processor

This subsection provides the procedures for removing and installing a Pentium III processor in your system. The system board has sockets for two processors. Each Pentium III processor is packaged in a Single Edge Contact Cartridge Version2 (SECC2). The cartridge includes the processor core with an integrated 16 KB primary (L1) cache; the secondary (L2) cache and a back cover. The primary processor connector is shown at (Figure 4-6, A) in the illustration below. The secondary processor connector is shown at (Figure 4-6,B).

⚠ CAUTION

Electrostatic discharge (ESD) can damage components; place them on an antistatic surface. Modify the system board using an antistatic wrist strap attached to chassis ground.

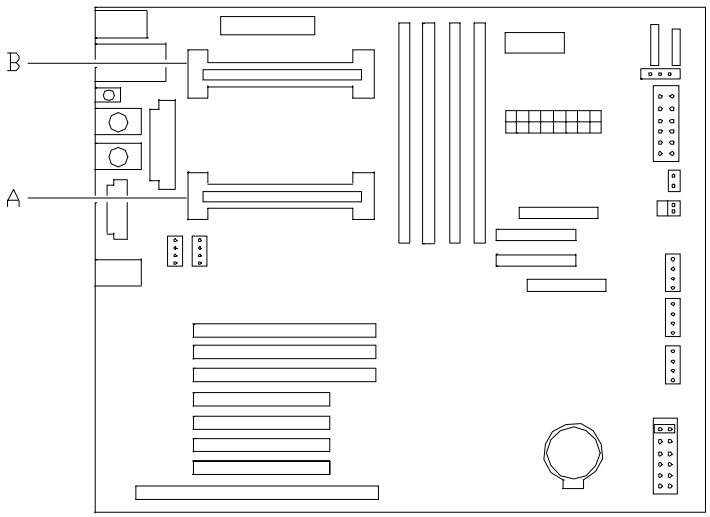


Figure 4-6. Removing and Installing a Pentium III Processor

⚠ WARNING

If the system has been running, any processor and heat sink already installed on the board will be hot. To avoid the possibility of a burn, let the components cool for 10 minutes before continuing with the procedures described here

Removing and Installing a Processor

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open the front door and remove the left side panel as described earlier in this chapter.

> **⚠ CAUTION**
> Observe static precautions. Use an antistatic wrist strap.
> Hold the processor only by its edges.

3. If your system has one processor and you are adding a second processor, then you must remove the termination board in the Slot 1 secondary connector and store it appropriately.
4. If your system has one processor and you are replacing it, leave the terminator board intact in the empty secondary processor connector. Remove the processor you want to replace.
5. If your system has two processors and you are replacing one or both, remove the appropriate one(s).
6. Pull the processor latches, (Figure 4-7,A) out away from the edges of the SECC2 cartridge to free them from the Universal Retention Module (URM).
7. Lift the SECC2 cartridge upward, out of the URM and place it on a grounded, static-free surface or conductive foam pad.
8. Put the old processor in a piece of conductive foam and store in an antistatic package.

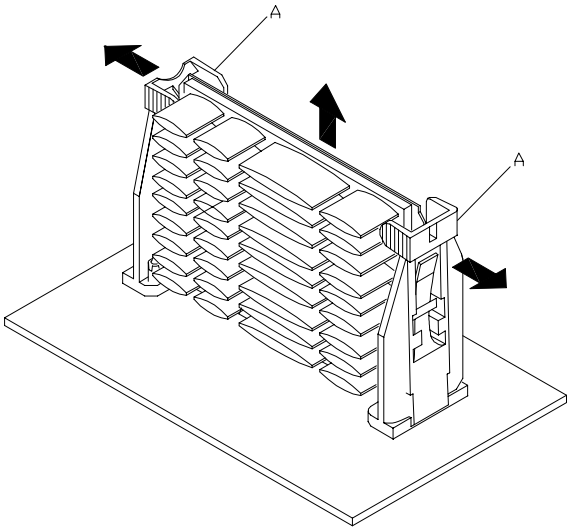


Figure 4-7. Removing a Processor

9. Remove the new processor from its antistatic package and place it on a grounded, static-free surface or conductive foam pad.

10. Position the processor back into the URM. Ensure that the alignment notch on the bottom of the SECC2 cartridge fits into the connector key in Slot 1. Push down firmly, with even pressure on both sides of the top, until clicking noises are heard as the cartridge is seated.

11. Replace the left side panel, plug in the system power cord, and power up the system.

DIMMs

The system board contains four DIMM sockets labeled 1 through 4 (Figure 4-8). Each socket can hold a single 72-bit DIMM module with 64MB, 128MB, 256MB, 512MB, or 1GB of memory. When all four sockets are populated, the system board supports a maximum of 4 GB of memory with 1GB DIMMs. A DIMM will always be installed in socket 1. When you install additional DIMMs, you must start with the first empty socket next to the DIMMs already installed. When you remove DIMMs, you must start with the highest number occupied DIMM socket on the system board.

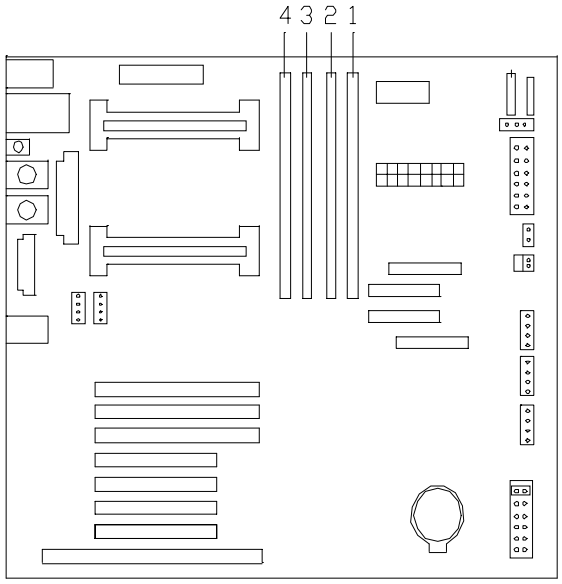


Figure 4-8. DIMM Locations

Installing DIMMs

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open the front door and remove the left side panel as described earlier in this chapter.

> **⚠ CAUTION**
> Observe static precautions. Use an antistatic wrist strap.
> Hold DIMMs only by their edges.

3. Holding the DIMM module only by the edges, remove it from its antistatic package.
4. Position the DIMM so that the two notches in the bottom edge of the DIMM align with the keyed socket. See Figure 4-9.

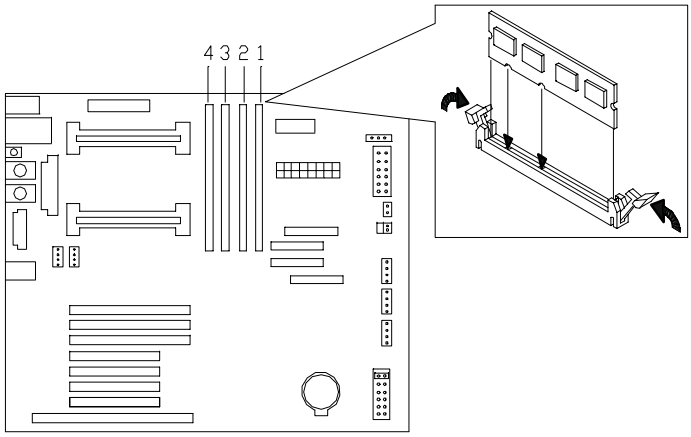


Figure 4-9. Inserting Memory DIMMs

5. Insert the bottom edge of the DIMM into the socket, and press down firmly on the DIMM until it seats correctly.
6. Gently push the plastic ejector levers on the socket ends to the upright position.
7. Repeat the steps to install each additional DIMM.
8. Replace the left side panel, plug in the system power cord, and turn on the system.

Removing DIMMs

⚠ CAUTION

Use extreme care when removing a DIMM. Too much pressure can damage the socket slot. Apply only enough pressure on the plastic ejector levers to release the DIMM

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open the front door and remove the left side panel as described earlier in this chapter.
3. Gently push the plastic ejector levers out and down to eject a DIMM from its socket. See Figure 4-9.
4. Hold the DIMM only by its edges, being careful not to touch its components or gold edge connectors. Carefully lift it away from the socket, and store it in an antistatic package.
5. Repeat the above steps to remove the remaining DIMMs.
6. Replace the side panel, plug in the system power cord, and turn on the system.

Option Boards

This section describes how to install and remove ISA and PCI option boards. The system board has one ISA bus expansion slot and seven PCI bus expansion slots. See Figure 4-10. The one ISA connector shares a chassis expansion slot with a PCI connector.

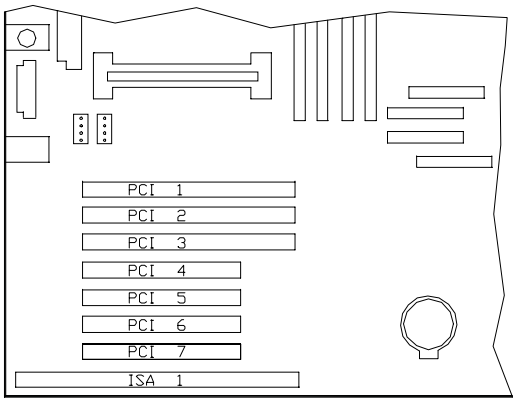


Figure 4-10. PCI and ISA Slot Locations

Installation Considerations

Newer adapters, designed for Plug-and-Play systems, are automatically configured by the system without any user intervention. Older ISA adapters must be manually configured as detailed below. Once the manual configuration is complete, the Plug-and-Play adapters are configured around the manually configured adapters without causing any resource conflicts.

ISA adapters can be Plug-and-Play. ISA adapters that are not Plug-and-Play must be manually configured following the instructions supplied with the board. The configuration is defined to the system by running the BIOS Setup Utility. If you are adding a non-Plug and Play ISA option board, run the BIOS Setup utility (press **F2** at the startup screen) before installing the board. For details on running the BIOS Setup utility, refer to Chapter 3 (Configuring Your System).

Installing an Option Board

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open the front door and remove the left side panel as described earlier in this chapter.
3. Remove and save the expansion slot screw and cover. See Figure 4-11.

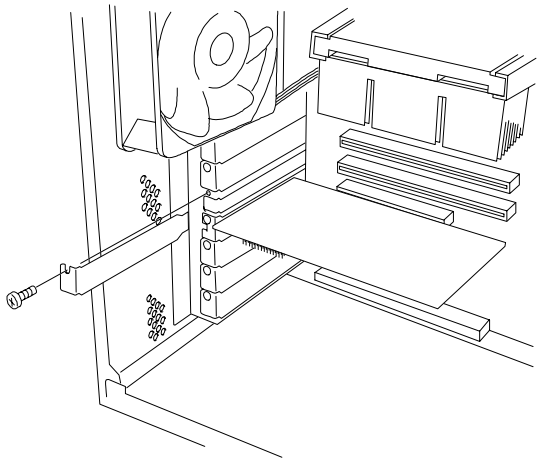


Figure 4-11. Removing the Expansion Slot Screw and Cover

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap.

4. Remove the option board from its protective wrapper, holding the board only by the edges. Do not touch the board components or the gold connectors.
5. Record the option board serial number in the equipment log.
6. Set any board jumpers or switches as described in the documentation that comes with the option board.
7. Refer to the documentation accompanying the option board for information on whether the board is a PCI or ISA board.

> ***Note:*** If you are adding a non-Plug and Play Legacy ISA option board, run the BIOS Setup utility (press **F2** at the startup screen) before installing the board. For details on running the BIOS Setup utility, refer to Chapter 3 (Configuring Your System).

8. Holding the board by its top edge or upper corners, firmly press the board into an expansion slot on the system board. The tapered foot of the option board retaining bracket must fit into the mating slot in the expansion slot . See Figure 4-12.

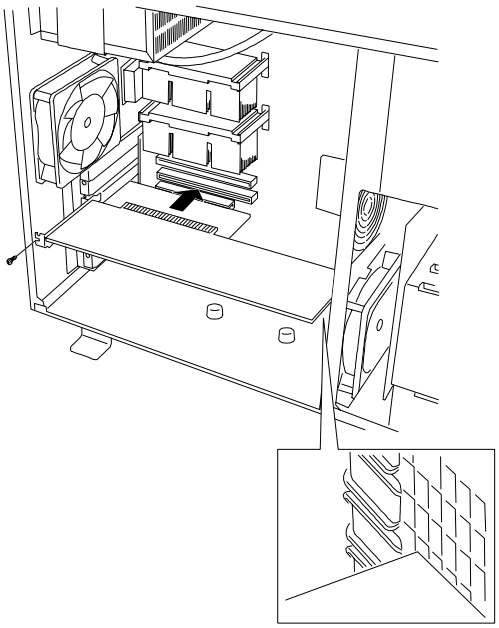


Figure 4-12. Installing an Option Board

9. Align the rounded notch in the retaining bracket with the threaded hole in the expansion slot frame. The retaining bracket fits into the space that was occupied by the expansion slot cover.
10. Reinstall the screw in the threaded hole. Be sure to push the bracket slot up against the screw before you tighten it. If this is not done, the bracket may interfere with an adjacent bracket.
11. Connect any external cables (if they are needed) to the installed option board.
12. Replace the left side panel and close the front panel.
13. Plug in the system power cord, and power on the system.

Removing an Option Board

> ***Note:*** Expansion slot covers must be installed on all vacant slots to maintain the electromagnetic emissions characteristics of the system and to assure proper cooling of the system components.

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open the front door and remove the left side panel as described earlier in this chapter.
3. Disconnect any cables attached to the option board you are removing.
4. Remove and save the option board retaining bracket screw.

5. Hold the board at each end and carefully rock it back and forth until the edge connectors pull free. Make sure that you do not scrape the board against other components.
6. Remove the board from the expansion slot and place it in an antistatic wrapper. If you are replacing a board, go to "Installing an Option Board" earlier in this chapter, otherwise continue.
7. Install an expansion slot cover over the vacant slot using the previously removed screw.
8. Replace the left side panel, close the front cover, plug in the system power cord, and power on the system.
9. If you removed a non-Plug-and-Play ISA option board, run the BIOS Setup utility (press **F2** at the startup screen) to configure the system as described in the “Configuring Your System” Chapter 3.

Installing a RAID Controller Board

Use this procedure to install a RAID controller board.

1. Install the RAID controller board into any PCI slot on the system board. See "Installing an Option Board" earlier in this chapter.
2. Cable the RAID controller board as described below (see "System Cabling" in Appendix A):
 - Remove the end of the SCSI interface cable that is plugged into the wide SCSI connector on the system board.
 - Reinstall the end of the SCSI interface cable just removed into the Channel 0 connector on the RAID board.

Hard Disk Drives

Your system supports a variety of SCSI hard disk drives installed in the system's hard disk drive bay. Contact your sales representative or dealer for a list of approved devices. The SCSI hard disk drive bay in your system is one of two types: a standard SCSI disk drive bay or a hot-swap SCSI disk drive bay. Refer to Figure 4-13 to identify the type of hard disk drive bay in your system. In each example the internal hard disk drives are located in the SCSI disk drive bays.

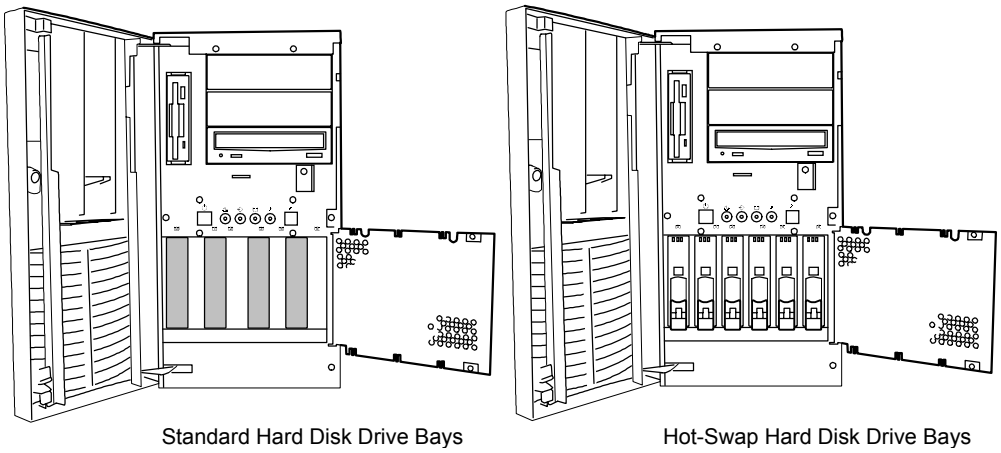


Figure 4-13. SCSI Disk Drive Bays

If you are adding or removing a SCSI hard disk device, consider the following:

⚠ CAUTION

Do not hot swap a non-LVD-disk-drive into a LVD-disk-drive only system for it may cause data corruption. The only way a non-LVD-disk-drive can be used with an all LVD-disk-drive system is by first powering down the system, installing the non-LVD-disk-drive, and then powering the system back up.

Note: Installing a non-LVD-disk-drive into an all LVD-disk-drive system causes all the drives to operate in the non-LVD mode

Installing or Swapping a Hard Disk Drive in a Hot-Swap Bay

This procedure describes installing a new hard disk drive or swapping out a faulty drive from one of the six hot-swap SCSI disk drive bays. The SCSI drives must use the industry standard 80-pin Single Connector Attachment (SCA) connector. Each drive must be installed in a drive carrier.

Note: To order a disk with a carrier, contact your sales representative or dealer.

- If installing new drives, follow an installation scheme starting with the left-most drive. Fill the bays left-to-right (1 through 6). See Figure 4-14.

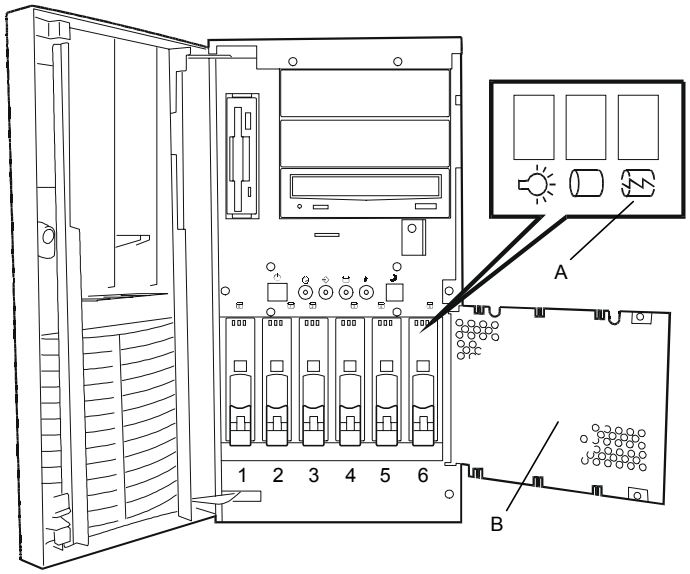


Figure 4-14. SCSI Disk Drive Installation Scheme

- The hard disk SCSI address assignment is:

Bay	Device	SCSI ID Address
1	First Hard Disk (Left)	0
2	Second Hard Disk	1
3	Third Hard Disk	2
4	Fourth Hard Disk	3
5	Fifth Hard Disk	4
6	Sixth Hard Disk (Right)	5

- If an individual SCSI drive fault LED (yellow light) is on steadily, this indicates that the drive has been flagged as faulty by the RAID host controller (See Figure 4-14,A). Follow the procedure described in this section to remove the faulty drive and swap in a good one.

Note: ESD can damage disk drives, boards, and other parts. This system can withstand normal levels of environmental ESD while you are hot-swapping SCSI hard drives. However, we recommend that you do all procedures in this chapter only at an ESD workstation or provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground—any unpainted metal surface—on your system when handling parts.

⚠ CAUTION

Drive manufacturer's caution against moving a disk drive that is still spinning because of possible damage to the drive.

After you determine which drive has been flagged as faulty, the procedure is the same to swap a drive or to install one for the first time.

Installing or Swapping a Hard Disk Drive

1. Open the front door as described earlier in this chapter.
2. Open the EMI metal panel in front of the hard drive cage by turning its two thumb lock screws counter clockwise (see Figure 4-14, B).
3. If swapping a hard disk drive, remove the drive and its carrier from the SCSI hard disk drive bay by performing the following procedures:

⚠ CAUTION

Depending on the drive fault, the drive may be still spinning when you remove it. Follow the next steps exactly when removing drives.

- Push the disk carrier locking tab downward (see Figure 4-15).
- Grasp the disk carrier handle and pull the faulty disk drive out of the bay far enough to disengage the drive connector from the backplane. Wait 30 seconds until the drive spins down.
- Remove the carrier from of the drive bay.

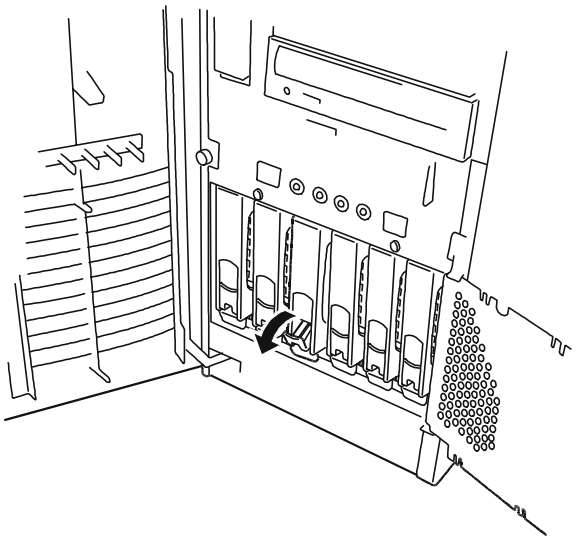


Figure 4-15. Removing a Hard Disk Drive and Carrier

4. Place the drive carrier on an antistatic surface with the four mounting screws facing up.
5. Remove the hard disk drive from the disk carrier. See Figure 4-16.

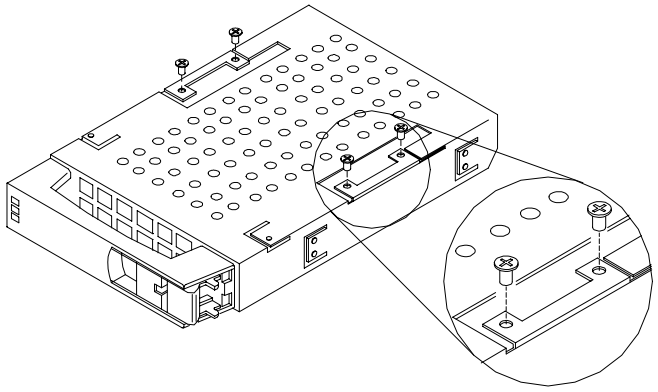


Figure 4-16. Removing/Installing a Hard Disk Drive to the Carrier

6. Remove the new drive from its protective wrapper, and place on an antistatic surface.

> **⚠ CAUTION**
> Observe static precautions. Use an antistatic wrist strap.

7. Record the drive model and serial numbers in the equipment log.
8. Install the replacement drive onto the drive carrier.
 - Place the drive on the carrier, with its connector facing the rear of the carrier.
 - Turn the drive and carrier over and secure the drive in the carrier with the four screws supplied with the disk drive. See Figure 4-16.
9. Install the drive carrier with drive into the bay as follows:
 - Open the disk carrier-locking tab.
 - Align the drive carrier with the bay guide rails.
 - Slide the drive carrier into the bay until it docks with the SCSI backplane connector. See Figure 4-17.
 - Close the disk carrier locking tab ensuring it is secured as shown in Figure 4-18.

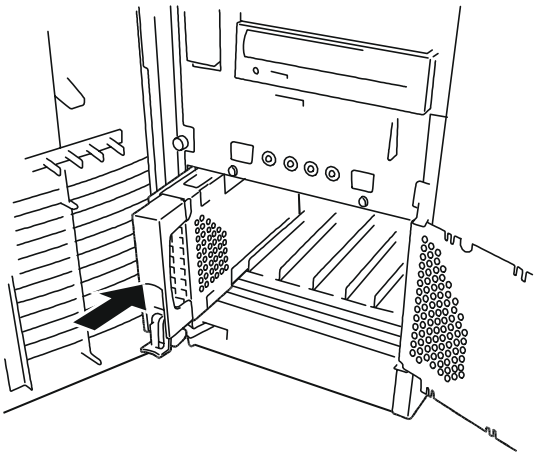


Figure 4-17. Installing a Disk Carrier into the Disk Bay

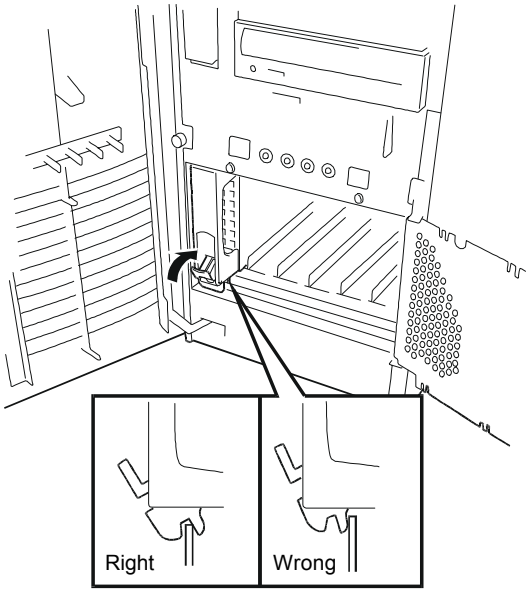


Figure 4-18. Locking the Disk Carrier

10. Close and secure the EMI metal panel.

11. Close the front door on the system. If necessary, configure the system as described in Chapter 3 "Configuring Your System".

Installing or Swapping a Hard Disk Drive in a Standard SCSI Disk Drive Bay

This procedure describes installing a new hard disk drive or swapping out a faulty drive from the SCSI disk drive bay. The drive bay must be removed from the system when installing or removing a hard disk drive. Disk drives must use the industry standard 68-pin Wide SCSI interface connector.

> ***Note:*** To order a hard disk drive, contact your sales representative or dealer.

- If installing new drives, follow an installation scheme starting with the left-most drive. Fill the bays right-to-left (1 through 4). See Figure 4-19.

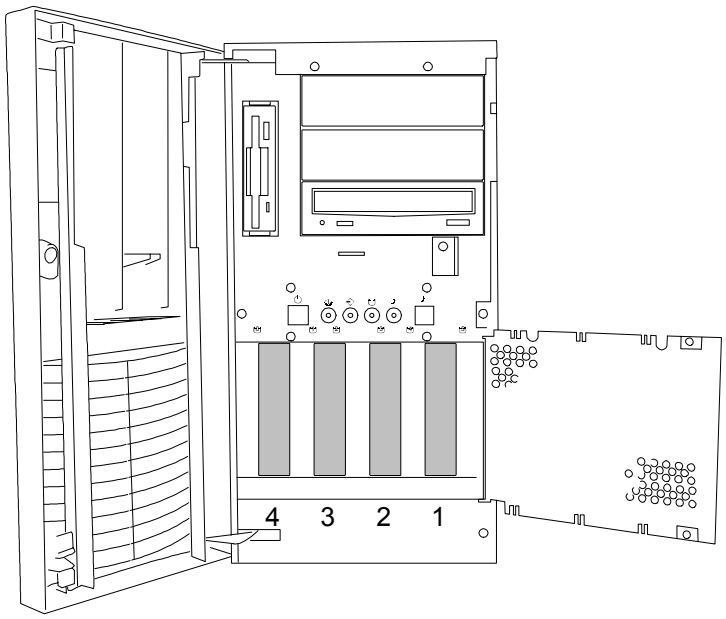


Figure 4-19. SCSI Disk Drive Installation Scheme

- The suggested hard disk SCSI address assignment is:

Bay	Device	SCSI ID Address
1	First Hard Disk (Right)	0
2	Second Hard Disk	1
3	Third Hard Disk	2
4	Fourth Hard Disk (Left)	3

> **Note:** ESD can damage disk drives, boards, and other parts. This system can withstand normal levels of environmental ESD while you are hot-swapping SCSI hard drives. However, we recommend that you do all procedures in this chapter only at an ESD workstation or provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground—any unpainted metal surface—on your system when handling parts.

Installing or Swapping a Hard Disk Drive

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open the front door as described earlier in this chapter.
3. Remove the left and right side panel as described earlier in this chapter.
4. Tag and disconnect all interface cables and voltage cables connected to all drives in the drive bay.

> **Note:** The drive bay is secured to the system chassis with five screws: one screw is located on the left side of the drive bay, two screws are located at the front of the drive bay, and two additional screws are located at the right side of the drive bay.

5. Remove the two mounting screws securing the drive bay to the right side of the chassis. See Figure 4-20, A, and B.

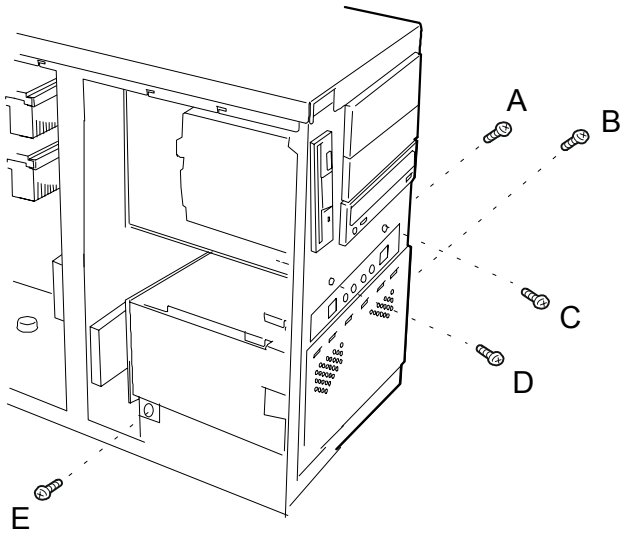


Figure 4-20. Removing the Hard Disk Drive Bay

6. Remove the two mounting screws securing the drive bay to the front of the chassis. See Figure 4-20, C, and D.

7. Support the drive bay and remove the mounting screw securing the drive bay to the left side of the chassis. See Figure 4-20, E.

8. The right side of the drive bay has a tab that is inserted into a slot in the right side of the chassis. Lift the drive bay upward to slide the drive bay tab out of the chassis slot.

9. Remove the drive bay out of the left side of the chassis. See Figure 4-21.

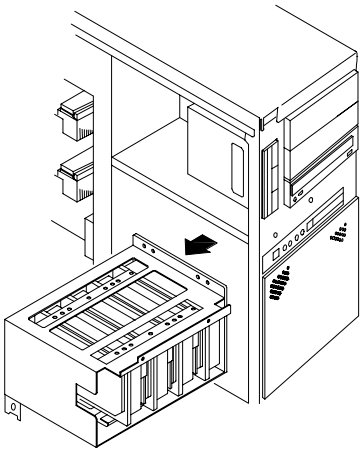


Figure 4-21. Removing the Drive Bay out of the Chassis

10. If you are installing a new or replacement hard disk drive, remove the drive from its protective wrapper. Record the drive model and serial number in the equipment log.

11. Set any drive jumpers or switches before you install the drive. See the documentation that comes with the device for jumper or switch information.

> ***Note:*** If a drive bezel is installed, it must be removed because it blocks the airflow around the drive. If the drive comes with drive rails, do not use them. Remove any rails

12. Position the drive in the chassis and secure with four screws. See Figure 4-22.

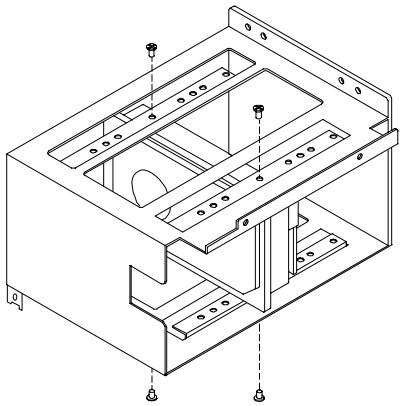


Figure 4-22. Removing the Drive Bay out of the Chassis

13. If you are removing a hard disk drive, remove the four screws securing the drive to the drive bay. See Figure 4-22.
14. Position the drive bay in the chassis and slide the tab located on the right side of the drive bay into the slot in the right side of the chassis.
15. Secure the drive bay to the chassis with the two front mounting screws removed in Step 6. See Figure 4-20, C and D.
16. Install the mounting screws that secure the drive bay to the right side of the chassis. See Figure 4-20, A and B.
17. Install the mounting screw that secures the drive bay to the left side of the chassis. See Figure 4-20, E.
18. Connect all interface cables and voltage cables to all drives in the drive bay.
19. Install the left and right side panels as described earlier in this chapter.
20. If open, close the EMI metal panel in front of the hard drive cage and secure by turning its two thumb lock screws clockwise.
21. Close and secure the front door.
22. Connect the system to its AC source and power up.

Removable Media Devices

A variety of SCSI removable media devices can be installed in peripheral bays A and B (Figure 4-23). An IDE CD-ROM is always mounted in bay C and a 3.5-inch diskette drive is always mounted in bay D. Other devices should be installed in the first available bay from the top (bay A). Contact your sales representative or dealer for a list of approved devices.

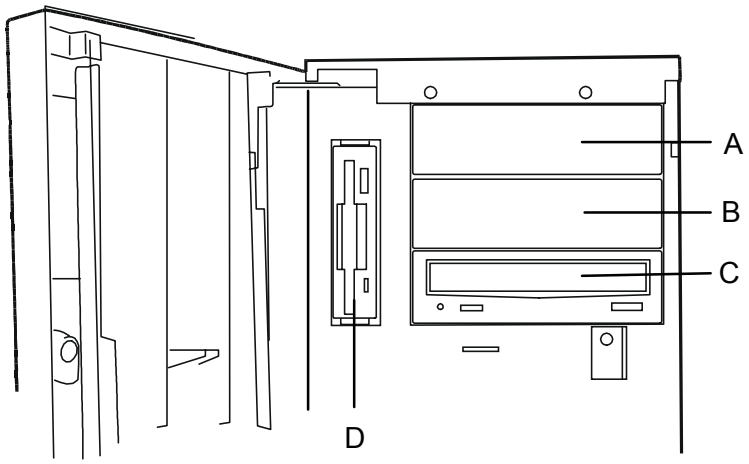


Figure 4-23. Removable Media Devices

If you are adding or removing a SCSI removable media device, consider the following:

- The optional SCSI tape drive address assignment is 2.
- The SCSI termination resistors must be installed in the last SCSI drive of the daisy chain cabling. If the SCSI tape drive is your only SCSI device on the SCSI controller B, termination must be enabled in the tape drive.

Removing the 3.5-Inch Diskette Drive Mounting Assembly

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open the front door as described earlier in this chapter.
3. Remove the left side panel as described earlier in this chapter.

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap.

4. Disconnect the power and interface cable from the rear of the diskette drive.
5. Remove the screw securing the diskette drive mounting bracket to the to the front panel. See Figure 4-24.

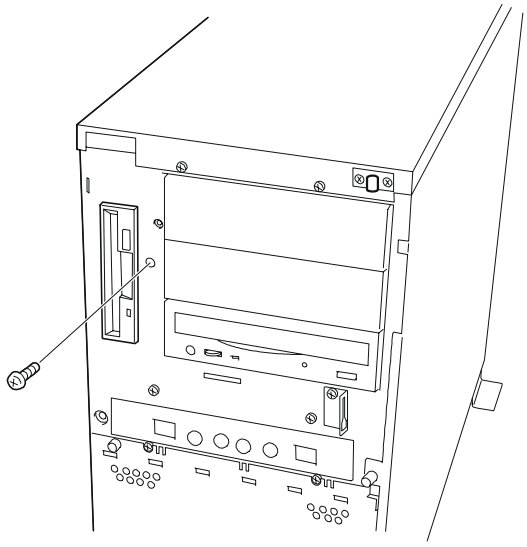


Figure 4-24. Removing the Diskette Assembly Mounting Screw

6. Slide the diskette assembly to the rear of the system to release the bracket from the removable media drive cage. See Figure 4-25.

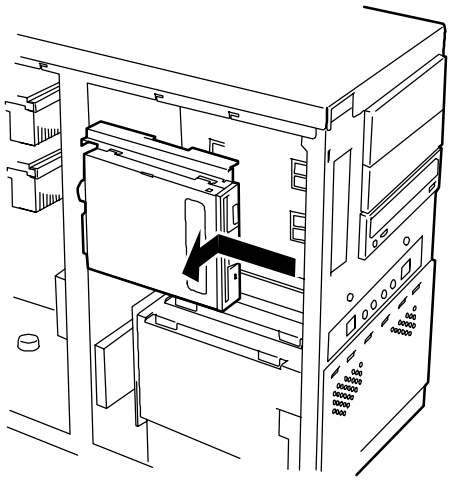


Figure 4-25. Removing the Diskette Assembly

7. Remove the diskette and mounting bracket from the system and place the assembly on an antistatic surface.

8. If you are replacing the diskette drive, remove the four screws securing the diskette drive to the mounting bracket.

9. Reverse Steps 1 through 8 to install a replacement diskette drive.

Installing a 5.25-Inch Media Device

⚠ CAUTION

CD-ROM devices contain a laser system and are classified as CLASS 1 LASER PRODUCTS. To use these devices, thoroughly read the documentation provided by the CD-ROM manufacturer, and keep the documentation for future reference. In case of any trouble with a CD-ROM, please contact your nearest service representative. To prevent direct exposure to the laser beam, do not try to open the enclosure. Use of controls or adjustments or performance of procedures other than those specified in the CD-ROM manufacturer's documentation may result in hazardous radiation exposure

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open the front door as described earlier in this chapter.
3. Remove the left side panel as described earlier in this chapter.

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap.

4. Perform Steps 4, 5, and 6 of *Removing the 3.5-Inch Diskette Drive* described earlier in this chapter. It is not necessary to remove the diskette drive from the mounting bracket to which it is mounted.
5. Remove the filler panel from the system bay location you are installing a media device. The filler panel is released by removing one screw located on the front right side of the filler panel (Figure 4-27, A) and another screw located inside the system on the left side of the filler panel (Figure 4-27, B).

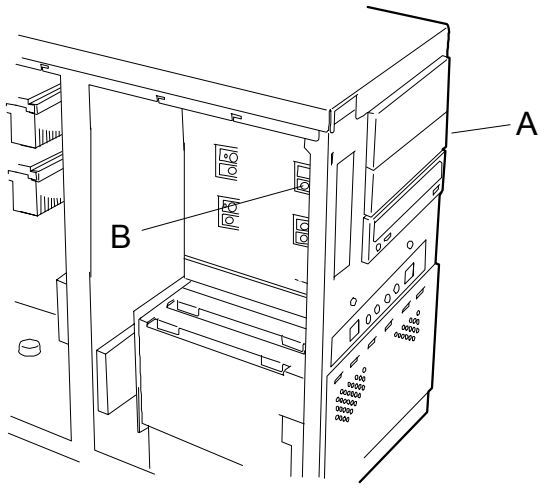


Figure 4-27. Removing the Filler Panel

6. Remove the screw securing the filler panel removed in the previous step to the right device rail. Save the right device rail. See Figure 4-28.

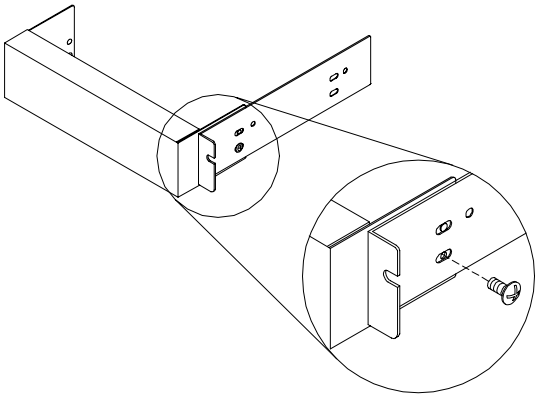


Figure 4-28. Removing the slide rail from the Filler Panel

7. Remove the device from its protective wrapper and place it on an antistatic surface. Record the drive model and serial number in the equipment log.

8. Set any drive jumpers or switches before you install the drive. See the documentation that comes with the device for jumper or switch information.

> ***Note:*** If the drive comes with drive rails, do not use them. Remove any rails already attached.

9. Position the right device rail along the right side of the device so that the four holes in the device rail match the four holes located in the side of the device. Attach the right device rail to the device with four screws as shown in Figure 4-29.

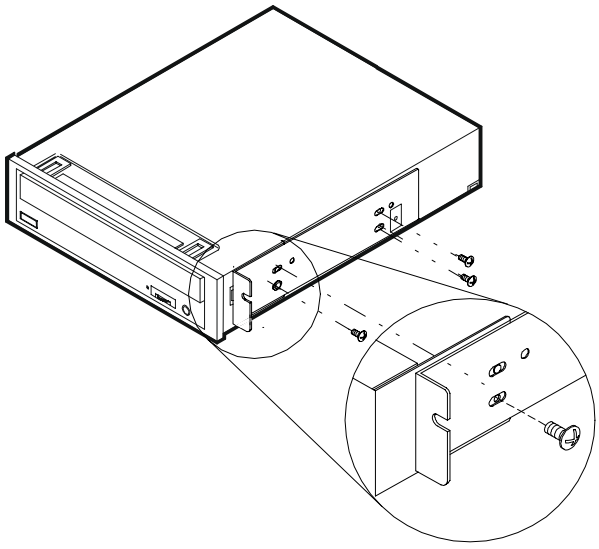


Figure 4-29. Attaching the Right Side Rail

10. Install the media device into the bay as follows:

- Move any cables in the bay out of the way.
- Align the rails on the media device with the supports in the bay.

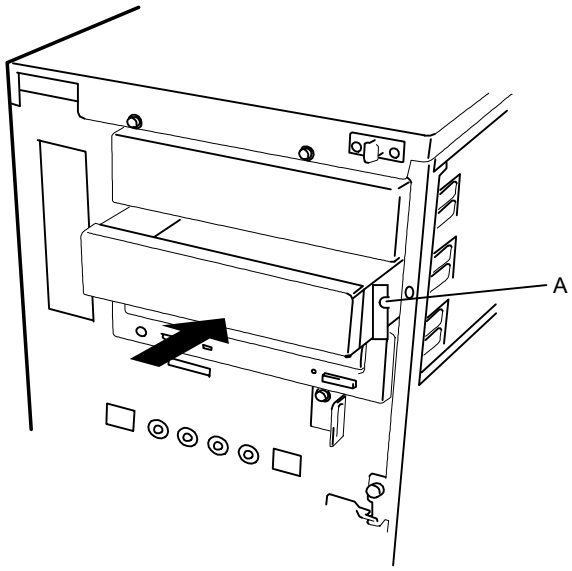


Figure 4-30. Installing a Removable Media Device

- Slide the device into the bay until the right slide rail is against the system cabinet. See Figure 4-30, A.

11. Secure the right side of the device to the system with the screw supplied. See Figure 4-30, A.

12. Secure the left side of the device to the device bay with two screws supplied. See Figure 4-31, A.

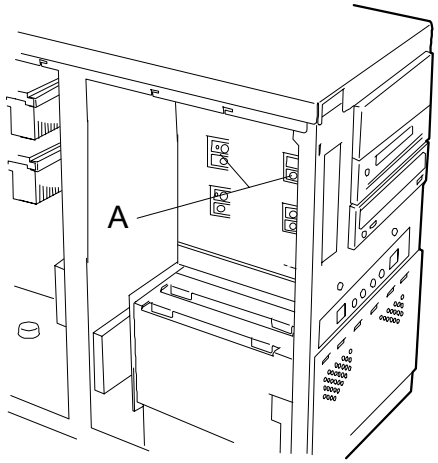


Figure 4-31. Securing a Removable Media Device

13. Connect the interface and power cable to the device.

14. Replace the left side panel and close the front panel.

15. Plug in the system power cord, and power on the system.

Removing a 5.25-Inch Device

⚠ CAUTION

CD-ROM devices contain a laser system and are classified as CLASS 1 LASER PRODUCTS. To use these devices, thoroughly read the documentation provided by the CD-ROM manufacturer, and keep the documentation for future reference. In case of any trouble with a CD-ROM, please contact your nearest service representative. To prevent direct exposure to the laser beam, do not try to open the enclosure. Use of controls or adjustments or performance of procedures other than those specified in the CD-ROM manufacturer's documentation may result in hazardous radiation exposure

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open the front door as described earlier in this chapter.
3. Remove the left side panel as described earlier in this chapter.

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap.

4. Perform Steps 4, 5, and 6 of *Removing the 3.5-Inch Diskette Drive* described earlier in this chapter. It is not necessary to remove the diskette drive from the mounting bracket to which it is mounted.
5. Disconnect the SCSI Interface cable and voltage cable from the rear of the device you are removing.
6. Remove the screws securing the device to the removable media device bay. See Figure 4-32, A, B.

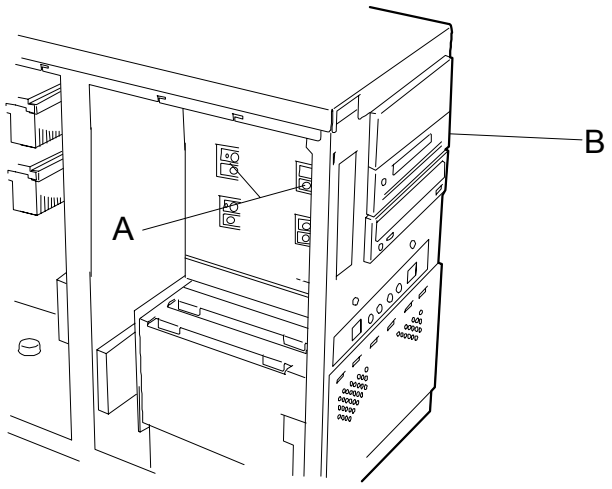


Figure 4-32. Removing a Removable Media Device

7. Slide the removable media device out of the device bay and set it down on an antistatic surface.
8. Remove the screws securing the right side rail to the device. See Figure 4-29.
9. To install a replacement device, follow the procedures in *Installing a 5.25-Inch Media* Device described earlier in this chapter.

5

Problem Solving

- Problem Solving
- Static Precautions
- Troubleshooting Checklists
- Diagnostic Testing
- Specific Problems and Corrective Actions
- Problems with the Network
- Plug and Play Installation Tips
- BIOS User’s Information
- How to Identify BIOS and BMC Revision Levels

Problem Solving

This chapter helps you identify and solve problems that may occur during system installation or while using your system. The first section of this chapter tells you how to reset your system in the event of problems. The next few sections provide troubleshooting checklists and procedural steps that help you isolate specific system problems. The last section includes BIOS, system, and disk status user information.

⚠ WARNING

The DC push-button on/off switch on the front panel does not turn off the system AC power. Also, +5vdc is present on the system board whenever the AC power cord is connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cords from the back of the chassis. Failure to disconnect power before opening your system can result in personal injury and equipment damage

⚠ CAUTION

Operating your system with the side panels removed can damage your system components. For proper cooling and airflow, always replace the side panels before powering on your system.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Troubleshooting Checklists

The following subsections provide troubleshooting checklists for problems that occur at initial system startup, when you run new application software, and after the system hardware and software have been running correctly.

Initial System Startup

Incorrect installation or configuration usually causes problems that occur at initial system startup. Hardware failure is a less frequent cause. If you have problems during initial system startup, check the following:

- Are the system power cords properly connected to the system and plugged into a NEMA 5-15R outlet (100-120 Vac) or a NEMA 6-15R outlet (200-240 Vac)?
- Is AC power available at the wall outlet?
- Is the power on/off push-button switch on the front panel in the ON position (power on LED should be lit)?
- Are all cables correctly connected and secured?
- Are all the PCI/ISA option boards fully seated in their connector slots on the system board?
- Are all jumpers and switch settings on option boards and peripheral devices correct? If applicable, ensure that there are no conflicts; for example, two option boards sharing the same interrupt.
- Are the processors fully seated in their slots on the system board? Refer to the "Upgrades and Options" chapter for installation instructions?
- Are all DIMMs fully seated and installed correctly? Refer to the "Upgrades and Options" chapter for installation instructions?
- Are all option boards and disk drives installed correctly? Refer to the "Upgrades and Options" chapter.
- Is the system hard disk drive properly formatted or defined?
- Is the operating system properly loaded? Refer to the operating system documentation.
- Are all drivers properly installed? For information about installing drivers, refer to your Network Operating System Configuration Guide.
- Are the configuration settings in BIOS Setup and the Adaptec SCSI Utility correct? For information about running these utilities, refer to the "Configuring Your System" chapter.

If the above items are all correct, but the problem reoccurs, refer to "Additional Troubleshooting Procedures" in this chapter.

Running New Application Software

Problems that occur when you run new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly. If you have problems while running new application software, check the following:

- Does the system meet the minimum hardware requirements for the software? Refer to the software documentation.
- Is the software an authorized copy? Unauthorized copies often do not work. Obtain an authorized copy of the software.
- If you are running the software from a diskette, is it a good copy?
- If you are running the software from a hard disk drive, is the software correctly installed? Where all necessary procedures followed and files installed?
- If you are running the software from a CD-ROM disk is the disk scratched or dirty?
- Are the correct device drivers installed?
- Is the software correctly configured for the system?
- Are you using the software correctly?
- If other software runs correctly on the system, contact your vendor about the failing software.

If the problems persist with the software, contact the software vendor's customer service representative.

After System Has Been Running Correctly

Problems that occur after the system hardware and software have been running correctly often indicate equipment failure. However, many situations that are easy to correct can also cause such problems. If you have problems after the system has been running correctly, check the following:

- If you are running the software from a diskette or CD-ROM, try a new copy of the software.
- If you are running the software from a hard disk drive, try running it from a floppy. If the software runs correctly, there may be a problem with the copy on the hard disk. Reinstall the software on the hard disk drive and try running it again. Make sure all the necessary files are installed.
- If the problem recurs, you may need to reformat the hard disk drive. The hard disk drive, the drive controller, or the system board may be defective.
- If the problems are intermittent, there may be a loose cable, dirt in the keyboard (if keyboard input is incorrect), a marginal power supply, or other random component failures.
- If you suspect that a transient voltage spike, power outage, or brownout might have occurred, reload the software and try running it again. Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands.

> ***Note:*** Voltage spikes can corrupt or destroy data files on the drive. If you are experiencing voltage spikes on the power line, install a surge suppresser between the power outlet and the system power cord.

If the problem recurs after you have checked and corrected all of the above items, refer to "Diagnostic Testing" in this chapter.

Diagnostic Testing

This section provides a more detailed approach to diagnostic testing and identification of a problem and locating its source.

Error Checking

Each time you turn on the system, POST (Power-On-Self-Test) runs automatically and checks the system boards, processors, memory, keyboard, and most installed peripheral devices.

If POST finds an error, it displays an error message. Refer to the *Error Message* section in this chapter for an explanation of each error message.

Troubleshooting Guide

Use the following troubleshooting procedures to help you identify a problem. These general procedures lead you through the following:

- Preparing the system for diagnostic testing
- Monitoring POST while it is running
- Verifying proper operation of key system LEDs
- Confirming loading of the operating system.

Preparing the System for Diagnostic Testing

To prepare the system for diagnostic testing, perform the following:

> ***Note:*** Before disconnecting any peripheral cables from the system, turn off the system and any external peripheral devices. Failure to do so can cause permanent damage to the system and/or the peripheral devices.

1. Turn off the system and all external peripheral devices. Disconnect all devices from the system except the keyboard and video monitor.
2. Make sure the system power cords are plugged into a properly grounded AC outlet.
3. Make sure your video display monitor and keyboard are correctly connected to the system. Turn on the video monitor. Set its brightness and contrast controls to at least two-thirds of their maximum ranges (refer to the documentation supplied with your video display monitor).
4. If the operating system normally loads from the hard disk drive, make sure there is no diskette in drive A. Otherwise, place a diskette containing the operating system files in drive A.
5. Turn on the system. If the power indicator LED does not light, refer to “Power Light Does Not Light” found later in this chapter.

Monitoring POST

Each time you turn on the system, the Power-On Self-Test (POST) runs automatically and checks the system board, processor board, memory, keyboard, and most installed peripheral devices.

During the memory test, POST displays the amount of memory that it is able to access and test. Depending on the amount of memory, it may take several minutes to complete the memory test.

Press **F2** to enter SETUP. If you do not press **F2**, the above message remains for a few seconds and the boot process continues.

If POST finds an error, it displays an error message and, in case there is a problem with the display, it emits a series of long and short beeps. Write down any beep code emitted. This information is useful to your service representative.

Refer to the "BIOS User's Information" section in this chapter for a list of items to check for each error code and for an explanation of the error beep codes.

The POST Tests table at the end of this chapter lists keys active during POST and provides a description of errors that may occur.

The BIOS indicates errors by writing an error code to the PS/2-standard logging area in the Extended BIOS Data Area, and by displaying a message on the screen, which is sometimes preceded by the POST Error Code. The error code will also be logged to the Event Logging area.

Report any error code to your service representative.

POST Keys and Errors

Action/Message	Description
If POST Beeps Before Video Appears	Initialization failed before video initialized. Most beep code errors are fatal; initialization cannot continue. Refer to the section “BIOS User’s Information” in this chapter.
If Monitor Displays Error	Note error; press **F1** to continue boot or **F2** to enter Setup. Refer to the section “BIOS User’s Information” in this chapter.
To Enter Setup	Setup changes specific options, then writes to CMOS, NVRAM. Press **F2** during initialization to run Setup. If you do not press **F2**, the boot process continues.
Enter BOOT Diskette	If prompted, insert the boot diskette.

Verifying Proper Operation of Key System Indicators

As POST determines the system configuration, it tests for the presence of each mass storage device installed in the system. As each device is checked, its activity indicator should turn on briefly. Check for the following:

- Does the diskette drive activity indicator turn on briefly? If not, refer to “Diskette Drive Activity Indicator Does Not Light” in this chapter.
- If there is a hard disk drive or SCSI devices installed in the system, does the hard disk drive activity indicator turn on briefly? If not, refer to “Hard Disk Drive Activity Indicator Does Not Light” in this chapter.

Confirming Loading of the Operating System

Once the system boots up, the operating system prompt appears on the screen. The prompt varies according to the operating system. If the operating system prompt does not appear, refer to “Problems with Application Software” found later in this chapter.

Specific Problems and Corrective Actions

This section provides possible solutions for the following specific problems:

- Power LED does not light
- No beep or incorrect beep pattern
- No characters appear on screen
- Characters on the screen appear distorted or incorrect
- System cooling fan does not rotate
- Diskette drive activity LED does not light
- Hard disk drive activity LED does not light
- CD-ROM drive activity LED does not light
- Problems with application software
- The startup prompt “Press <F2> key if you want to run Setup” does not appear on the screen.
- The bootable CD-ROM is not detected.

Try the solutions in the order given. If you cannot correct the problem, contact your service representative for assistance.

Power LED Does Not Light

Check the following:

- Is the system operating normally? If so, the power LED is probably defective.
- Are there other problems with the system? If so, check the items listed under System Cooling Fans Do Not Rotate.

Incorrect or No Beep Code

Check the following:

- Is the speaker cable connected to the system board?

If the system operates normally, but there was no beep, the speaker may be defective, contact your service representative for assistance.

Record the beep code emitted by POST, and see the "Messages and Beep Codes" section found later in this chapter.

No Characters Appear on Screen

Check the following:

- Is the keyboard working? Check to see if the **Num Lock** light is functioning.
- Is the video display monitor plugged in and turned on?
- Are the brightness and contrast controls on the video monitor properly adjusted?
- Are the video monitor switch settings correct?
- Is the video monitor signal cable properly installed?
- Is the onboard video controller enabled?

If you are using a video controller board, verify that the video controller board is fully seated in the system board connector.

If there are still no characters on the screen after you reboot the system, contact your service representative or authorized dealer for assistance.

POST emits one long beep and two short beeps pattern to indicate a possible problem with the video display controller. If you do not receive a beep pattern and characters do not display, the video display or video controller may have failed. Contact your service representative or authorized dealer for assistance.

Characters are Distorted or Incorrect

Check the following:

- Are the brightness and contrast controls properly adjusted on the video display? Refer to the documentation supplied with your video display.
- Are the video monitor's signal and power cables properly installed?
- If the problem persists, the video monitor may be faulty or it may be the incorrect type. Contact your service representative for assistance.

System Cooling Fans Do Not Rotate

Check the following:

- Is AC power available at the wall outlet?
- Are the system power cords properly connected to the power supplies and the AC wall outlets?
- Are the power connectors for the cooling fans connected? See the "Monitor Matrix" table in Appendix C.
- Is the front panel power on indicator lit?

If the switches and connections are correct and the power outlet is functioning, the power supply has probably failed. Contact your service representative for assistance.

Diskette Drive Activity LED Does Not Light

Check the following:

- Are the diskette drive's power and signal cables properly installed?
- Is the diskette drive properly configured?
- Is the diskette drive activity light always on? If so, the signal cable may be plugged in incorrectly.

If you are using the onboard diskette drive controller, use BIOS Setup to make sure that the diskette drive controller is set to Enabled. For information about running BIOS Setup, refer to the “Configuring Your System” chapter.

If the problem persists, there may be a problem with the diskette drive, system board, or drive signal cable. Contact your service representative for assistance.

CD-ROM Drive Activity Light Does Not Light

Check the following:

- Is the power and signal cable to the CD-ROM drive properly installed?
- Are all relevant switches and jumpers on the drive set correctly?
- Is the drive properly configured?
- Is the onboard IDE controller enabled?

Problems with Application Software

If you have problems with application software, perform the following:

- Verify that the software is properly configured for the system. Refer to the software installation and operation documentation for instructions on setting up and using the software.
- Verify a different copy of the software to see if the problem is with the copy that you are using.
- Make sure all cables are installed correctly.
- Verify that the system board jumpers are set correctly. Refer to the "Configuring Your System" chapter for jumper settings.
- If other software runs correctly on the system, contact your vendor about the failing software.

If the problem persists, contact the software vendor's customer service representative for assistance.

Bootable CD-ROM Is Not Detected

Check the following:

- Is the BIOS set to allow the CD-ROM to be the first bootable device? Check your BIOS Setup (F2) configuration.

Problems with the Network

Diagnostics pass, but the connection fails:

- Make sure the network cable is securely attached.

The controller stopped working when an add-in adapter was installed:

- Make sure the cable is connected to the port from the onboard network controller.
- Make sure the other adapter supports shared interrupts. Also, make sure your operating system supports shared interrupts; OS/2 does not.
- Try reseating the add-in adapter.

The add-in adapter stopped working without apparent cause.

- Try reseating the adapter first; then try a different slot if necessary.
- The network driver files may be corrupt or deleted. Delete and then reinstall the drivers.
- Run the diagnostics.

Plug and Play Installation Tips

Some common PCI tips are listed here.

- Reserve interrupts (IRQs) and/or memory addresses specifically for an ISA adapter. This prevents PCI cards from trying to use the same settings an ISA card is using. Use the BIOS Setup Utility to keep track of ISA adapter resources.
- Certain drivers may require interrupts that are not shared with other PCI drivers. The BIOS Setup Utility can be used to adjust the interrupt numbers for PCI devices. For certain drivers, it may be necessary to alter settings so that interrupts are not shared.

BIOS User's Information

This section describes the various screen messages and beep codes of the system BIOS. The BIOS indicates errors by writing an error code to the PS/2-standard logging area in the Extended BIOS Data Area, and by displaying a message on the screen, which is sometimes preceded by the POST Error Code. The error code will also be logged to the Event Logging area.

Note: Your system error log will be lost, if your system ac power source is off or disconnected.

POST Error Codes and Messages

Whenever a recoverable error occurs during POST, BIOS displays a message on the video display screen and causes the speaker to beep as the message appears. BIOS also issues a beep code (one long tone followed by two short tones) during POST if the video configuration fails or if an external ROM module does not a checksum of zero. The "POST Error Codes and Messages" table is a list of the error codes and messages written at the start of each POST test. The "POST Error Beep Codes" table is a list of beep codes issued for each POST test.

POST Error Codes and Messages

Code	Error Message
0200	Failure Fixed Disk
0210	Stuck Key
0211	Keyboard error
0212	Keyboard Controller Failed
0213	Keyboard locked - Unlock key switch
0220	Monitor type does not match CMOS - Run SETUP
0230	System RAM Failed at offset
0231	Shadow RAM Failed at offset
0232	Extended RAM Failed at address line
0233	Memory type mixing detected
0234	Single-bit ECC error
0235	Multiple-bit ECC error occurred
0250	System battery is dead - Replace and run SETUP
0251	System CMOS checksum bad - Default configuration used
0260	System timer error
0270	Real time clock error
0271	Check date and time
02B0	Diskette drive A error
02B2	Incorrect Drive A type - run SETUP
02D0	System cache error - Cache disabled
0B1B	PCI System Error on Bus/Device/Function
0B1C	PCI Parity Error on Bus/Device/Function
0B30	CPU 1 Fan Alarm occurred
0B31	CPU 2 Fan Alarm occurred
0B32	Chassis Fan Alarm occurred

Post Error Codes and messages (Continued)

Code	Error Message
0B33	Power Unit Fan 1 Alarm occurred
0B34	Power Unit Fan 2 Alarm occurred
0B46	ESMINT not configured
0B50	CPU #1 with error taken off line
0B51	CPU #2 with error taken off line
0B5F	Forced to use CPU with error
0B60	DIMM group #1 has been disabled
0B61	DIMM group #2 has been disabled
0B62	DIMM group #3 has been disabled
0B63	DIMM group #4 has been disabled
0B6F	DIMM group with error is enabled
0B70	The error occurred during temperature sensor reading
0B71	System Temperature out of range
0B74	The error occurred during voltage sensor reading
0B75	System Voltage out of range
0B7C	The error occurred during fan sensor reading
0B80	BMC Memory Test Failed
0B81	BMC Firmware Code Area CRC check failed
0B82	BMC core hardware failure
0B83	BMC IBF or OBF check failed
0B90	BMC Platform Information Area Corrupted
0B91	BMC update firmware corrupted
0B92	Internal Use Area of BMC FRU corrupted
0B93	BMC SDR Repository empty
0B94	IPMB signal lines do not respond
0B95	BMC FRU device failure
0B96	BMC SDR Repository failure
0B97	BMC SEL device failure
0BB0	SMBIOS - SROM data read error
0BB1	SMBIOS - SROM data checksum bad
0BD0	1st SMBus device address not acknowledged
0BD1	1st SMBus device Error detected
0BD2	1st SMBus timeout

Post Error Codes and messages (Continued

Code	Error Message
0C00	RomPilot reports error number xx
None	Expansion ROM not initialized
None	Invalid System Configuration Data
None	System Configuration Data Read error
None	Resource Conflict
None	System Configuration Data Write Source
None	NOTICE: Your System Redundant Power Supply is not configured
None	WARNING:IRQ not configured

Post Error Beep Codes

Beeps	Error	Cause	Recommended Action
1-2-2-3	ROM Checksum Error	—	Change system board
1-3-1-1	DRAM Refresh Test Error	—	Change memory DIMM's
1-3-1-3	Keyboard Controller Test Error	—	Change system board
1-3-3-1	Memory Not Detected	No memory.	Verify DIMM installation.
		Can not write to memory	Change memory DIMM's
	Memory Capacity Check Error	No memory.	Verify DIMM installation.
		Can not write to memory	Change memory DIMM's
1-3-4-1	DRAM Address Test Error	Memory address signal failure	Change DIMM or M/B
1-3-4-3	DRAM Test low byte Error	Memory data signal failure (low)	Change DIMM or M/B
1-4-1-1	DRAM Test high byte Error	Memory data signal failure (high)	Change DIMM or M/B
1-4-3-3	All Memory Group Errors	—	—
2-1-2-3	BIOS ROM Copy-Write Test Error	Error with Shadow RAM	Change system board
2-2-3-1	Unexpected Interrupt Test Error	Unexpected interrupt	Change CPU or system board
2-3-1-3	All Memory Group Errors	Memory address signal failure	Change DIMM or M/B
3-3-1-4	Memory Not Detected	—	—
1-2	Option ROM Initialization Error	Failure to initialize Option ROM BIOS	Change system board or option board
1-2	Video configuration fails	Failure to initialize VGA BIOS	Change option video board or system board
1-2	OPTION ROM Checksum Error	Failure to initialize Option BIOS	Change M/B or option board

How to Identify BIOS and BMC Revision Levels

To help you identify your system's current BIOS and BMC revision levels, refer to the following subsections.

BIOS Revision Level Identification

During system Power-On Self Test (POST), which runs automatically when your system is powered on, your system monitor displays several messages, one of which identifies the BIOS revision level currently loaded on your system, see the example below.

> ***Note:*** In order to see the diagnostic messages, the ESC key must be pressed.

Example: BIOS Revision Level

```
Phoenix BIOS 4.0 Release 6.0.250A
```

In the example above, BIOS 6.0.250A is the current BIOS revision level loaded on your system.

> ***Note:*** The BIOS Revision Level stated in the example may not reflect the actual BIOS setting in your system.

BMC Revision Level Identification

During system Power-On Self Test (POST), which runs automatically when your system is powered on, system diagnostics are run. Following the memory test diagnostic, several messages will appear informing you that the mouse was detected and system configuration data updated, when you see these messages the BMC messages are displayed next.

> ***Note:*** In order to see the diagnostic messages, the ESC key must be pressed.

To identify your system's current BMC revision level, see the example below.

Example: BMC Messages

```
Base Board Management Controller
Copyright (c) 1999 NEC Corporation, all rights reserved.
Device ID          :01      Device Revision     :00
IPMI Version       :1.0     Firmware Revision   :00.60
Self Test Result   :
```

In the example above, Firmware Revision 00.60 is the current BMC revision level loaded on your system.

> ***Note:*** The Firmware Revision Level stated in the example may not reflect the actual BMC revision level setting in your system.

A

System Cabling

- System Cabling
- Before You Begin
- Static Precautions
- Standard Configuration
- RAID Configuration

System Cabling

This appendix contains information and procedures on cabling configurations used in your system.

The cabling configurations include:

- Standard Configuration
- RAID Configuration.

Before You Begin

⚠ WARNING

The DC push-button on/off switch on the front panel does not turn off the system AC power. Also, +5vdc is present on the system board whenever the AC power cords are connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cords from the back of the chassis. Failure to disconnect power before opening your system can result in personal injury and equipment damage.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Standard Configuration

Your system is cabled using a single channel on-board IDE Controller and dual channel on-board Adaptec 7899 SCSI Controller.

The on-board IDE controller supports the standard internally mounted CD-ROM as its master device. If only one device is on a channel connector it must be set as the master device.

The AIC 7899 contains two independent SCSI channels that share a single PCI bus master interface. Each channel is capable of operations using either 8- or 16-bit SCSI providing 160 MB/s (Ultra-160/M) or 80 MB/s (Wide Ultra2) throughput. If your system includes the hot-swap hard disk drive bay, channel A attaches to an Ultra-160/M SCSI backplane that supports up to six 160/M SCA drives. If your system includes the standard hard disk drive bay, channel A attaches directly to a maximum of four 160/M non-hot-swap drives. Controller B can be used to support SCSI devices in the removable media bays. A 68 pin to 50 pin converter is also available to be used when installing SCSI narrow devices.

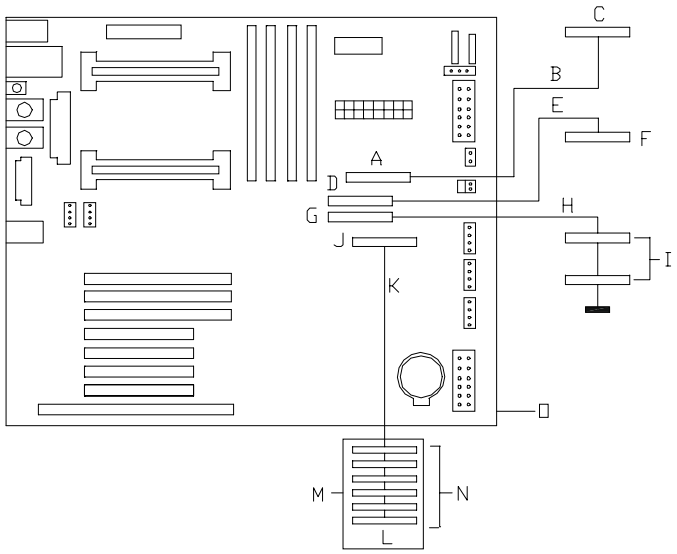
A 3.5-inch diskette drive is also installed in all systems and interfaces separately to the system board.

Figure A-1 illustrates a system that includes the hot-swap hard disk drive bay. Referring to the Figure A-1 below, a 68-pin Ultra-160/M SCSI interface cable (K) is connected to the SCSI connector (J) on the middle right edge of the system board. This cable connects to the rear of the hard disk drive's SCSI backplane (L).

The IDE interface cable (E) is connected to the IDE connector (D) towards the middle right edge of the system board. This cable connects to the rear of the internally mounted CD-ROM drive (F).

Optional internally mounted SCSI removable media devices (I) may be connected to the SCSI controller connector (G).

Figure A-2 illustrates a system that includes the standard hard disk drive bay. This figure is identical to Figure A-1 with the exception that the 68-pin Ultra-160/M SCSI interface cable (K) connects to each drive (L) in the standard drive bay.



A – Diskette drive connector

B – Diskette interface cable

C – Diskette drive

D – IDE connector

E – IDE interface cable

F – IDE CD-ROM drive

G – Ultra2 SCSI connector (68 pin)

H – Ultra2 SCSI interface cable

I – Optional SCSI removable media devices

J – Ultra-160/M SCSI connector (68 pin)

K – Ultra-160/M SCSI interface cable

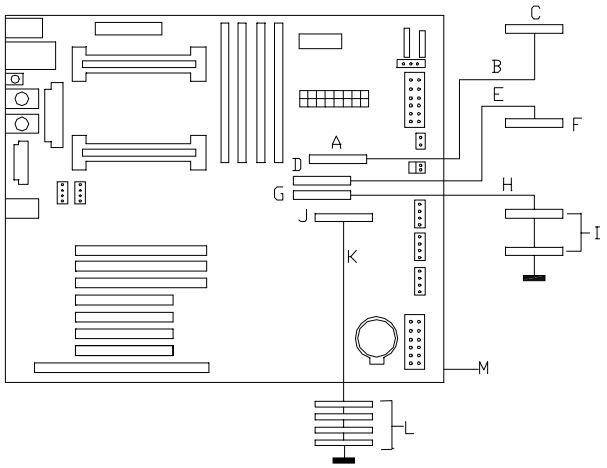
L – Six SCSI disk drive bays

M – SCSI backplane

N – SCSI hard disk drives

O – System board

Figure A-1. Standard System Cable Configuration (Hot-swap Drive Bay)



A – Diskette drive connector

B – Diskette interface cable

C – Diskette drive

D – IDE connector

E – IDE interface cable

F – IDE CD-ROM drive

G – Ultra2 SCSI connector (68 pin)

H – Ultra2 SCSI interface cable

I – Optional SCSI removable media devices

J – Ultra-160/M SCSI connector (68 pin)

K – Ultra-160/M SCSI interface cable

L – Four SCSI disk drives

M – System board

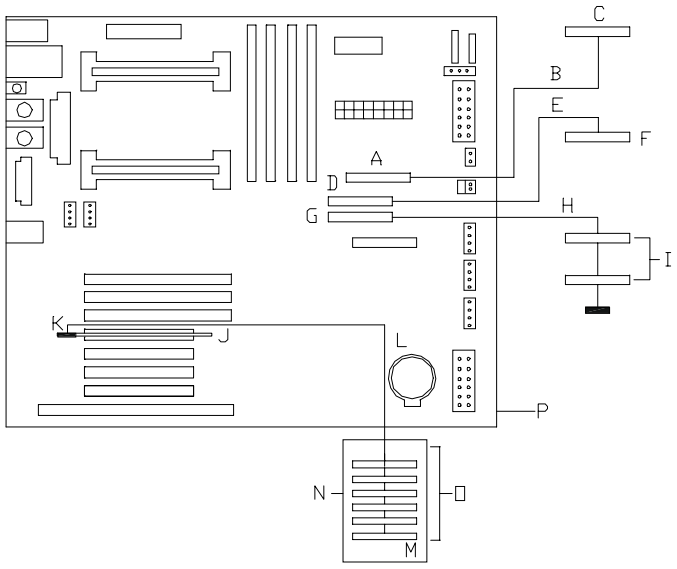
Figure A-2. Standard System Cable Configuration (Standard Drive Bay)

RAID Configuration

The RAID options available for your system provide your system with the added security of fault tolerance.

If you order a system with a RAID controller, the system is pre-cabled at the factory (see "RAID System Cabling Configuration" figures below.)

If you are adding a RAID controller you must install, cable, and configure the controller. Refer to "Installing a RAID Controller Board" in Chapter 4.



A – Diskette drive connector

B – Diskette interface cable

C – Diskette drive

D – IDE connector

E – IDE interface cable

F – IDE CD-ROM drive

G – Ultra2 SCSI connector (68 pin)

H – Ultra2 SCSI interface cable

I – Optional SCSI removable media devices

J – RAID controller

K – Ultra-160/M SCSI connector (68 pin)

L – Ultra-160/M SCSI interface cable

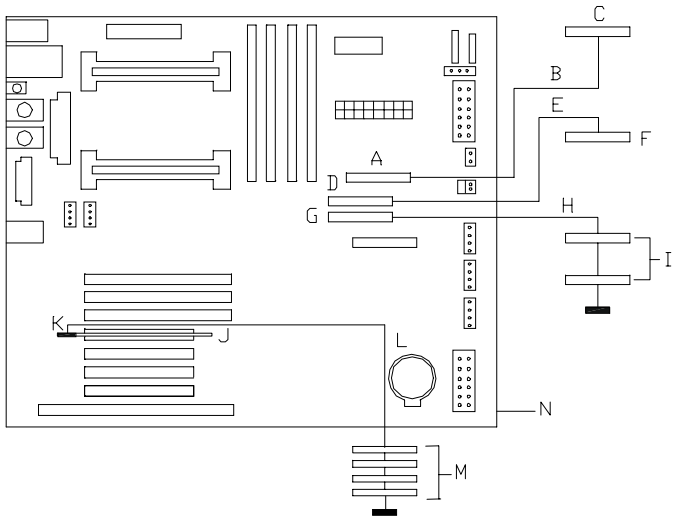
M – Six SCSI disk drive bays

N – SCSI hard disk drives

O – SCSI backplane

P – System board

Figure A-3. RAID System Cable Configuration (Hot-swap Drive Bay)



A – Diskette drive connector

B – Diskette interface cable

C – Diskette drive

D – IDE connector

E – IDE interface cable

F – IDE CD-ROM drive

G – Ultra2 SCSI connector (68 pin)

H – Ultra2 SCSI interface cable

I – Optional SCSI removable media devices

J – RAID controller

K – Ultra-160/M SCSI connector (68 pin)

L – Ultra-160/M SCSI interface cable

M – Four SCSI disk drives

N – System board

Figure A-4. RAID System Cable Configuration (Standard Drive Bay)

B

Management Workstation Application

- Overview
- MWA System Requirements
- Installing MWA
- MWA Main Window
- Using MWA
- Dialog Boxes
- Troubleshooting

Overview

Management Workstation Application (MWA) is an application used for remote server management in a network environment. The managed server may be remotely accessed from a management PC (the computer in which ESMPRO™ operates). MWA is a pre-boot management application in that the managed server is accessed prior to loading the server operating system. See Figure B-1.

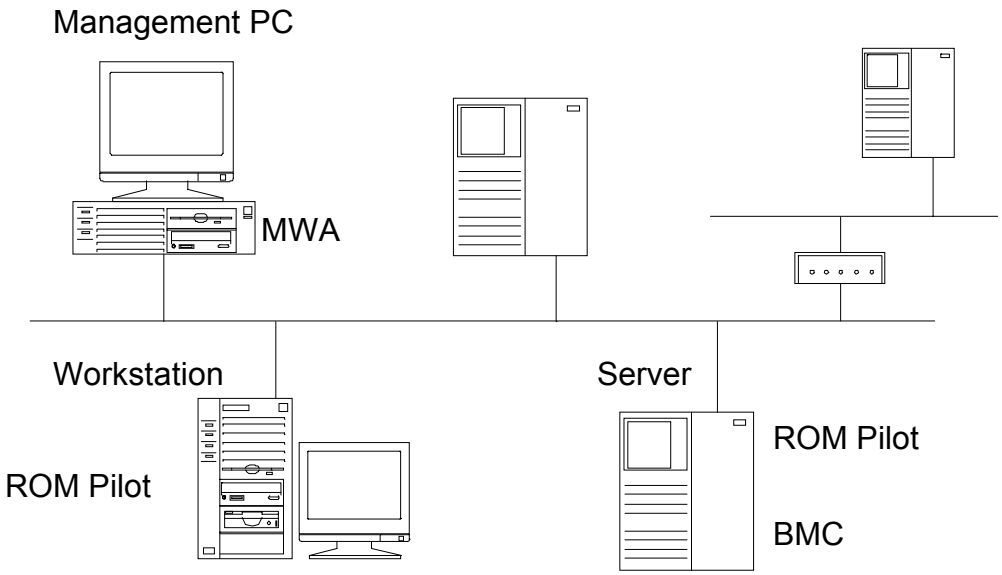


Figure B-1. Managed Server Configuration

The following server operations are available from a management PC running MWA software:

- **Remote console control** — This function enables you to see the screen of a server from the console of the management PC and to key in data to the server from the keyboard of the management PC.
- **Remote drive access** — This function enables a server to access a floppy disk drive on the management PC. A server can also be booted from the floppy disk on the management PC.
- **SOS recovery** — If a SOS message is received from a server, MWA receives the fault information and sends the necessary instructions to the server for recovery.
- **Alert to ESMPRO™** — If MWA receives an alert message from a server, it sends this message to ESMPRO™ AlertManager.
- **Power cycling** — This function enables powering the server OFF and ON.
- **Reset control** — This function enables reset of the server.
- **Event Log retrieval** — All event log data recorded in the server is retrieved by the management PC.

Remote Console

Remote console enables the user to view the screen of a server or key in data to the server from the keyboard of the management PC as if operating the keyboard of the server. When a server is connected to MWA, the remote console function allows the server screen to display in the server window.

Remote Drive

Remote drive allows a server to access the diskette drive on the management PC or a FD image file as if it were the drive on the server.

> **Note:** A FD image file is copied and saved from a floppy disk. This file can be used instead of a floppy disk as a remote drive for a server.

A server can also be booted from a floppy disk on the management PC. When the remote drive function is in use, [RD] is displayed at the title bar of the server window. In this case diskette drive A on a server is allocated as a remote drive. Therefore, the floppy disk drive of the server itself cannot be used while the remote drive function is in use.

MWA System Requirements

This section outlines the management PC requirements necessary for using MWA.

Operating Systems:

- Windows 95 / Windows 98 / Windows NT 4.0 or later
- More than 3MB of free RAM
- More than 5MB of disk space
- ESMPRO Version 3.22 or later
- TCP/IP Network.

Managed Server:

- Servers managed by MWA must support the RomPilot extended BIOS.

Installing MWA

To use MWA several procedures must be performed to configure the managed server and the management PC. For ease of installation these procedures should be performed in the order presented in the following sections. Installation procedures include procedures to be performed at the server and at the management PC.

Server Procedures

- Create a server system generation diskette (SG) containing essential server networking information.
- Run the BIOS Setup Utility making the changes to BIOS necessary for server acceptance of MWA support.

Management PC Procedures

- Install MWA software on the management PC.
- Configure and register SG information within MWA at the management PC.

Creating a Server System Generation Diskette (SG)

For the management PC to connect with a server, server system generation (SG) information must be configured and registered on MWA software running on the management PC.

In this procedure you will create a diskette containing your server's SG information. In the following section, you will register the SG information with MWA.

1. Prepare a floppy disk, formatted with MS-DOS.
2. Insert the EXPRESSBUILDER CD in the server's CD-ROM drive, and boot the server from the CD. The EXPRESSBUILDER menu displays.
3. Select **Custom Setup**.
4. Select **System Management**.
5. Select **Network Setup**. The Network setup program starts.
6. Insert the floppy disk prepared in step 1 into the server's diskette drive and press the **ESC** key.

7. Set the SG information as follows. (The items with * marks must be entered.)

 - Computer Name*
 Enter the server name.
 - IP Address*
 Enter the IP address of the server.
 - Subnet Mask*
 Enter the subnet mask of the server.
 - Default Gateway*
 Enter the IP address of the default gateway on the network.
 - Management PC (1)(3)'s IP*
 Enter the IP address of the management PC with MWA installed. (1)(3) shows priority.
 - Pass-phrase*
 Enter the pass-phrase that is used for communication between server - RomPilot and management PC - MWA.
 - Community Name (SMC supported servers)
 Enter a key for authentication used between server SMC and management PC - MWA (community name for SNMP trap). Default value is public.
 - Magic Number (SMC supported servers)
 Enter code key that is used between server - SMC and management PC - MWA.
 - Recovery Mode (SMC supported servers)
 Select automatic or manual.
 If automatic is selected, SMC automatically executes recovery processing when a fault occurs. It will be accepted as an instruction from MWA.
 - SOS Alert (SMC supported servers)
 Select SOS Alert enabled or disabled.
 If disabled is selected, SMC will not send an SOS message to MWA when a fault occurs.

8. Select **Save Setting**. SG information is saved on the floppy disk. You will need this floppy disk (called the SG information FD) to register the server on the management PC MWA.

Note: For details on Network setup, see EXPRESSBUILDER online help.

Configuring Server BIOS Setup

To use MWA, you must configure the server's BIOS with three specific settings enabled. These settings take place in Advanced Menu and the Hardware Menu of the BIOS Setup. (Refer to Chapter 3, "Configuring Your System," for BIOS Setup information.) The following table shows the settings that must be enabled to use MWA.

Menu Parameter Name	Required Setting for MWA
ADVANCED MENU	
Advanced Press **Enter** for menu.	
ROMPilot Support	Enabled
Peripheral Configuration Press **Enter** for menu.	
LAN controller	Enabled
SYSTEM HARDWARE MENU	
Wake On LAN	Enabled

Installing MWA on the Management PC

To Install MWA on the management PC perform the following procedure.

1. Start Windows95 / Windows 98 / or Windows NT on the management PC.
2. Insert the EXPRESSBUILDER CD into the PC CD-ROM drive.
3. Using Explorer, execute "setup.exe" in MWA folder of the CD-ROM. MWA installer will start.
4. Follow MWA installer instructions.

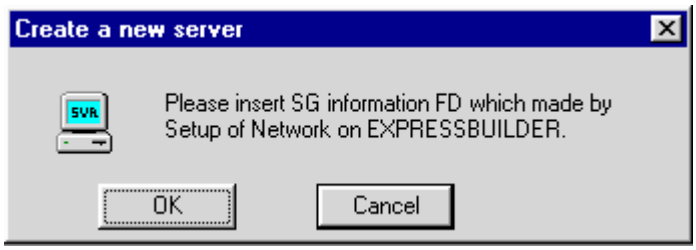
> ***Note:*** MWA will be registered in the Startup folder after installation, and started automatically when an OS start (Log in) is initiated.

Registering SG Information on MWA

In order for MWA to connect with a server, the server system generation information (SG) must be set and registered on MWA.

In this procedure SG information is registered on MWA from the server System Generation diskette (SG) created in the section *Creating a Server System Generation diskette (SG).*

1. Run MWA on the management PC and select the New SG command from File menu. The *Create a New Server* dialog box displays.



2. Insert the SG Information floppy disk into the management PC diskette drive.
3. Select OK. Server SG information is registered on MWA.

MWA Main Window

The MWA main window provides a graphical user interface (GUI) to access server control operations and to launch the management plug-ins. At the top of the GUI is the menu and tool bar. These provide the options to initiate plug-ins and other support features. A status bar at the bottom displays connection information like server name, line status, and mode.

Toolbar

The tool bar buttons of MWA main window combine server control and management plug-in options available from the Connect and Action menus as follows.



Open - The Open command opens a server window for a specified server.



Connect - The Connect command connects a current server.



Disconnect - The Disconnect command disconnects a current server.



Pause POST - The "Pause POST" command will pause to the server in the middle of POST if selected when the current server is executing POST.

To resume POST, select the Go to End of POST command, the Go (MWA mode) command, or the Go (No MWA mode) command.



Go to End of POST - The "Go to End of POST" command will pause the server at the end of POST if selected when the current server is executing POST.

To resume booting, select MWA mode command or the No MWA mode command.



MWA mode - When MWA mode command is selected when POST is paused, the server resumes POST and executes booting in MWA mode.



No MWA mode - If the No MWA mode command is selected when POST is paused, the server resumes POST and executes booting in No MWA mode.

Main Menu

MWA Main menu has the following menus.

File

- **New SG** — registers server system generation (SG) information. This command requires the SG information floppy disk described in *Registering SG Information on MWA*. When this command is selected, the Create a new server dialog box displays. Insert the floppy disk and click the OK button. If the IP address in a new server SG information exists in an old server SG information; the old information is updated. Once the registration has been completed, the server SG information is saved as (IP address).rp file. MWA can be connected only to servers registered using the New SG command.
- **Open** — opens a server window for a specified server. The Open a Server dialog box lists SG-registered servers on MWA. Select a server to operate.
- **Close** — closes the active server window and disconnects the server.
- **Delete** — deletes the SG information for the selected server.
- **Write back SG** — saves server SG information on a floppy disk. The SG information can be set again using the floppy disk. When this command is selected, the Write back a server dialog box displays. Insert a formatted floppy disk and select the OK button. Then, select a server from the server list. SG information for only one server can be saved on a floppy disk because the server SG information for all files is saved under the same name.
- **Properties** — displays or set properties for the current server. If no servers are in operation, the Select a Server dialog box opens. Select a server to change its properties. In the Server Properties dialog box, view or set necessary information.
- **Defaults** — allows you to view and set basic properties for all servers in the Default Server Properties dialog box. If [Use Default Settings] is checked in the Server Properties dialog box, server properties are set to the values specified in the Default Server Properties dialog box.
- **Configure** — changes MWA configuration in the Configure dialog box. Timer counts for no response detected. After connecting to a server, MWA sometimes cannot receive any response from the server because the server is busy. If the server responds within specified timer count, MWA does not close communication. Increase the timer count if you expect the server to be busy for a long time. The default is 300 seconds.
- **Server Monitor** — enables or disables the monitor for servers. The server monitor continually monitors server status using PING or RPC even when MWA is not connected to the servers. The status of the current server is displayed in the status bar. When the server monitor is enabled, a check mark appears next to the menu item.

- **Exit** — terminates MWA and closes the connections to all servers.

View

- **Toolbar** — displays or hides the toolbar. The toolbar includes buttons for some of the most common commands in MWA, such as the Open command. When the toolbar is displayed, a check mark appears next to the menu item.
- **Status Bar** — displays or hides the status bar. The status bar describes the action to be executed by the selected menu item or depressed toolbar button, and information on the current server. When the status bar is displayed, a check mark appears next to the menu item.
- **Summary** — opens or closes the Server Summary dialog box. The Server Summary dialog box displays the IP addresses, server names, and current statuses of all the SG-registered servers on MWA. When the Server Summary dialog box is open, a check mark appears next to the menu item.
- **History Log** — opens or closes the History Log dialog box. The History Log dialog box displays server communications, operator commands, and other events in chronological order. When the Delete button is selected, the Delete Logged Messages dialog box displays. The operator can delete all or part of the log. When the History Log dialog box is open, a check mark appears next to the menu item.

Reset/Reboot

- **Cold Reset** — executes a cold reset on a current server.
- **Warm Reset** — command executes a warm reset on a current server. Some types of servers have been set such that a cold reset is executed by the Warm Reset command. For details, refer to the users guide for the managed machine.
- **Wake-up** — activates a server whose power is off. The Wake-Up command is executed normally under the following conditions. MWA knows the server MAC address as the server has been connected with MWA more than once. OS was terminated normally the last time server was active.
- **Pause at Next Connect** — specifies whether to pause POST when a current server is connected the next time. When pause is set, a check mark appears next to the menu item. Note that this setting is valid only when the server is connected the next time and not for later connections.

Data

- **CMOS** — displays the CMOS data of a current server in the Data dialog box. The data can be read only when the server is paused at the end of POST.
- **ESCD** — displays the ESCD data of a current server in the Data dialog box.

- **DMI** — displays the DMI data of a current server in the Data dialog box. The data can be read only when the server is paused at the end of POST.
- **PCI** — When the Read button is selected in the PCI Information dialog box, the PCI information of a current server is displayed. The information includes a bus number, a device number and a function number of each device name and so on.

Window

- **Cascade** — command arranges the opened windows in an overlapping fashion.
- **Tile** — arranges the opened windows in a non-overlapping fashion.
- **Arrange Icons** — arranges icons for minimized windows at the bottom of the main window. If there is an open window at the bottom of the main window, then some or all of the icons may not be visible because they will be underneath this window.
- **Server Window Names 1,2** — MWA displays a list of currently opened server windows at the bottom of the Window menu. A check mark appears in front of the current server window name. Select a server window to activate.

Pop-Up Menus

Clicking the right mouse button in a server window displays a Pop-up menu. From this menu, you can execute main commands on the current server.

- **Connect command** — connects the current server to the management PC. Once the server has been connected, [Connected] is displayed in the title bar and the server screen displays in the server window.
- **Disconnect command** — closes the connection to a current server. Once the server has been disconnected, [Not Connected] is displayed in the title bar.
- **Change Remote Drive command** — temporarily changes the remote drive of a current server. This command can be executed only when a remote drive is in use. Set the necessary information in the Temporary Change to Remote Drive dialog box. This command does not update the server properties. The setting becomes invalid when the server is disconnected.
- **Pause POST command** — pauses the server in the middle of POST when the current server is executing POST. To resume POST, select the Go to End of POST command, then select Go (MWA mode) command, or the Go (No MWA mode) command.
- **Go to End of POST command** — pauses the server at the end of POST when the current server is executing POST. To resume booting, select the Go (MWA mode) command or the Go (No MWA mode) command.
- **Go (MWA mode) command** — When the Go (MWA mode) command is selected when POST is paused, the server resumes POST and executes booting in MWA mode.
- **Go (No MWA mode) command** — If the Go (No MWA mode) command is selected when POST is paused, the server resumes POST and executes booting in No MWA mode.
- **Restore Final Screen command** — displays the remote console screen as it appeared immediately before the server was disconnected. This command becomes valid after the server is disconnected.
- **Clear Screen command** — clears the remote console display. This command becomes valid after the server is disconnected.
- **Server Summary Pop-up menu** — Position the cursor on a server record in the Server Summary dialog box and click the right button to display the Server Summary Pop-up menu. From this menu, can execute main commands on the server.

Using MWA

Opening a Server Window

To remotely access a managed server from the management PC using MWA, you must open a server management window for the server. You can then issue commands to the server and make various settings though this window.

There are two ways to open a server window:

- **Using a command** — Select **Open** from the File menu. The **Select a Server** dialog box displays. Select the server you want to remotely access.
- **Automatic connection** — If a server is set for automatic connection, MWA opens a server window and connects to the server when a notification is received from the server. Refer to *Connection and Disconnection* in the next section.

Connecting and Disconnecting the Server

MWA is a pre-boot management application. MWA can be connected to a server only from the time the server is powered on or reset until the operating system is booted in the server. Once a server is connected, the remote control function displays the server screen in the server window at the management PC. Most MWA functions can be executed only when a server is connected.

Connect to a server as follows:

- **Connect command** — Select Connect from the Pop-up menu in the server window.
- **Setting automatic connection** — Select Properties from the Pop-up menu in the server window. The Server Properties dialog box displays. Check [Activate] for RESET or POST Error alert on the Alert page. After this setting is made, MWA will automatically connect to the server each time a specified alert is reported from the server.

Disconnect a server from the management PC using one of the following commands:

- **Disconnect command** — Select Disconnect from the Pop-up menu in the server window.
- **Close command** — Close from the File menu closes the active server window and closes the connection to the server.
- **Exit command** — Exit from the File menu terminates MWA and closes the connections to all servers.
- **Server reset or reboot** — When a server is reset, its connection to MWA is closed. If automatic connection is set for the server, the server is connected again.

Using a Remote Drive

When a remote drive is in use, [RD] displays in the title bar of the server window. To connect to a remote drive, perform the following steps:

1. Select Properties from the Pop-up menu in the server window to open the Server Properties dialog box. Select the Remote Drive page.
2. At the Remote Drive page, select the remote drive to use. Select [Floppy A:] or [FD Image File]. If [FD Image File] is selected, enter the file name of the FD image. The FD image file should be created in advance.

> ***Note:*** If [Read Only] is checked, a FD image file can be used in some servers.

To change the remote drive FD image file:

1. Select the Change Remote Drive command from the Pop-up menu in the server window. The Temporary Change to Remote Drive dialog box opens.
2. Select [Floppy A:] or [FD Image File]. If [FD Image File] is selected, enter a file name.

> ***Note:*** If [Read Only] is checked, a FD image file can be used in some servers.

> ***Note:*** The Server must be reset after a remote drive is used in the server.

Setting and Clearing Server Pause

MWA can pause server processing during or at the end of the server Power On Self Test (POST.)

Set a server pause as follows:

- **Pause command** — During server POST, select Pause POST from the Pop-up menu in the server window. The server pauses immediately. When the Go to End of POST command is executed, the server pauses again after completing the POST.
- **Pause at Next Connect command** — To set pause at the next server connection, select the Pause at Next Connect command from the Pop-up menu in the server window. When pause is set, a check mark appears next to the menu item.
- **Pause at POST error command** — Select Properties from the Pop-up menu in the server window to open the Server Properties dialog box. Check [Activate] for POST error alert on the Alert page. When MWA receives this alert message from the server, MWA will connect to the server and the server POST will be paused

Clear a server pause to resume processing as follows:

- **Go command** — To resume server processing, select the Go (MWA mode) command or the Go (No MWA mode) command from the Pop-up menu in the server window.

A server pause is also cleared in the following ways:

- Time-out reset
- If there is no communication between MWA and a disconnected server for five minutes or longer, the server is automatically reset.

Recovering from an SOS

If a fault is detected, a server that includes a system management controller (SMC), SMC transmits an SOS message to the management PC. When this SOS message is received, MWA opens an SOS Receive dialog box to display the SMC event log and other information.

The server recovery method depends on the recovery mode of each server.

- **Automatic recovery mode** — If an SOS message is received from a server, MWA displays the server information in an SOS Receive dialog box but does not accept a server recovery instruction from the operator. The server automatically executes recovery processing, such as reset.
- **Manual recovery mode** — If an SOS message is received from a server, MWA displays the server information in an SOS Receive dialog box and waits for a server recovery instruction from the user. Make an appropriate instruction in the dialog box.

Note: If SOS Alert is disabled in [Setup of Network] in the server, the server does not send SOS message to MWA.

Alerting ESMPRO™

If MWA receives an alert message from a server, it sends this message to ESMPRO™ AlertManager. Alert types from MWA to ESMPRO are as follows.

- Alerts from the server RomPilot
 - System Reset
 - *POST stalled (Reset by POST stalled)
 - *SMI stalled (Reset by SMI stalled)
 - *Boot failed (Reset by boot failed)
 - POST end (Booting)
 - POST error
 - Security breach attempted
- Alert from the server System Management Controller (SMC)
 - Sensor limit alarm
 - CPU missing
 - POST stalled
 - SMI handler alarm
 - SMI handler stall

* Not supported by some server models.

Dialog Boxes

Select a Server Dialog Box

The Select a server dialog box displays a list of SG-registered servers on MWA.

Server Properties Dialog Box

From the Server Properties dialog box you can view and set properties for the current server. The contents of the server properties are as follows:

- **ID page** — provides server identification information, such as a server name, an IP address, a MAC address, and a UUID.
- **Alert page** — Sets MWA operation for each type of alert which comes from a server.
- **[Sound] is checked** — MWA beeps when an alert is received from a server. The server window of the server becomes active.

- **[Activate] is checked** — When an alert is received from a server, the window of the server becomes active. If [Activate] is checked for RESET or POST Error alert, MWA attempts to connect to the server. If [Use Default Settings] is checked, this property is set to the values set by the Defaults command.
- **Remote Drive page** — A remote drive can be set for a server.
- **[None] is check** — A remote drive is disabled. Server's local drive can be used.
- **[Floppy A:] is checked** — A floppy disk drive on the management PC becomes a remote drive for the server.
- **[FD Image File:] is checked** — A specified FD image file in the management PC becomes a remote drive for the server. If an image file is set as a remote drive, click the Create/Copy Image File button to display the Create/Copy Image File dialog box. From there you can create an image file or copy one to a floppy disk. If [Read Only] is checked, one FD image file can be used by more than one server. If [Use Default Settings] is checked, this property is set to the value set by the Defaults command.

Default Server Properties Dialog Box

From the Default Server Properties dialog box you can view and set basic properties of all servers. If [Use Default Settings] in the Server Properties dialog box is checked, the server property is set to the values set by the Defaults command.

- **Alert page** — Set MWA operation for each type of alert from a server.
- **[Sound] check** — MWA beeps when an alert is received from a server. The server window of the server becomes active.
- **[Activate] check** — When an alert is received from a server, the window of the server becomes active. If [Activate] is checked for RESET or POST Error alert, MWA attempts to connect to the server.
- **Remote Drive page** — A remote drive can be set for servers.
- **[None] check** — A remote drive is disabled. Server's local drive can be used.
- **[Floppy A:] check** — A floppy disk drive on the management PC becomes a remote drive for the server.
- **[FD Image File:] check** — A specified FD image file in the management PC becomes a remote drive for the server. If a FD image file is set as a remote drive, click the Create/Copy FD Image File button to display the Create/Copy FD Image File dialog box where you can create an FD image file or copy one to a floppy disk. If [Read Only] is checked, one FD image file can be used on multi servers.

Create/Copy FD Image File Dialog Box

The Create/Copy FD Image File dialog box is used to create a FD image file as a remote drive or to copy the contents of a FD image file onto a floppy disk. Select an operation to execute.

Server Summary Dialog Box

The Server Summary dialog box lists IP addresses, server names, and current status of all the SG-registered servers on MWA. This dialog box also allows the following operations:

- **Activating a server window** — Double-click on a server record to open and activate the server window for the server.
- **Executing a command on the server** — Click the right-mouse button on a server record to display the Server Summary Pop-up menu. From this menu, you can execute main commands, such as Open, Connect, and Properties on the server.

Delete Logged Messages Dialog Box

The Delete Logged Messages Dialog Box sets conditions for deleting logged messages from the history log.

- **Delete history timed at xx/xx/xx xx:xx:xx and earlier** — If a logged message is selected in the History Log dialog box, a condition for deletion can be set for messages of the same date and time and earlier. The condition becomes invalid after deletion.

 If [Server xxx:xxx:xxx:xxx only] is checked, only the messages of the specified server are deleted.

 If [General (Non-server) messages only] is checked, the messages not dependent on the server, such as Started MWA, are deleted.

 If [All messages] is checked, all the messages at the specified date and time and earlier are deleted.

- **Automatically Delete messages** — These conditions of deletion are stored and remain valid.

 If [Keep only messages less than xx days old] is checked, messages within the specified number of days from the current day are kept and other messages are deleted automatically.

 If [Keep only the xx most recent messages] is checked, the specified number of recent messages are kept and other messages are deleted automatically.

 This Automatic Deleting process is executed when the OK button is selected in the dialog box, MWA is started, and MWA is exited.

Data Dialog Box

The Data dialog box displays the CMOS, ESCD, or DMI data of a server. This dialog box also allows the following operations.

- Compare Current Data — The previously acquired data of the current server is compared with the present data of the server, the previously acquired data of another server, or file data.

 To compare with the data of another server, select a server in the Select a server dialog box. If an error is detected by this comparison, the Data Differences dialog box displays the compared data.

- Read Data from Server — The present data of the current server is acquired and displayed. The Save As button is used to save the acquired data in a file.

Temporary Change to Remote Drive Dialog Box

The Temporary Change to Remote Drive dialog box changes a remote drive for a server temporarily.

If [Floppy A:] is checked, a floppy disk drive on MWA-active management PC becomes a remote drive for the server.

If [FD Image File:] is checked, a specified FD image file in the management PC becomes a remote drive for the server.

If [Read Only] is checked, one FD image file can be used by more than one server. Since no FD image file can be created or copied in this dialog box, create a file using the Defaults command or the Properties command in advance.

SOS Receive Dialog Box

If a fault is detected, a server that includes the system management controller (SMC) transmits a SOS message to the management PC. When this SOS message is received, MWA opens the SOS Receive dialog box to display the server information. If the server is in Manual Recovery Mode, MWA requests the operator for the server recovery method. When MWA communicates an inquiry to the server, [Connecting] is displayed in the title bar. You can do nothing in the dialog box while the message is displayed. Wait until the message is cleared.

It is only when the OS cannot run normally due to a fault in the server that you can control the server from this dialog box. If the server is already recovered, the server cannot be operated from MWA.

Contents and functions of the dialog box are as follows:

- **Server:** The dialog box displays the name and the IP address of the server that issued the SOS message, as well as the firmware version of the SMC on the server and the recovery mode of the server. If the recovery mode is Automatic, the server is automatically reset for recovery after this dialog box displays. The server cannot be controlled from MWA.
- **Message:** The dialog box displays the SOS message received from a server on the first line. The display box also displays the SMC event log of the server sequentially from the latest data up to when the SOS occurred.
- **Server last status:** The dialog box displays the LCD contents immediately before the SOS message transmission, the POST code of the last boot processing, and the current power status (DC).
- **Server control:** The operator can send recovery instructions to a server. The buttons are explained below. If a button operation causes an error, take the appropriate action on the server that sent the SOS message.

— Power cycle: Use this button to turn the server off and on again. The dialog box closes after the normal execution of server control is confirmed.

— Reset: Use this button to reset a server. The dialog box closes after the normal execution of server control is confirmed.

— Power on: Use this button to turn a server on. The dialog box closes after the normal execution of server control is confirmed.

— Power off: Use this button to turn a server off.

— SMI dump: The dump switch of a server is turned on. This function is valid only for a server whose power is on. Some types of servers may not support this function. If this function is not supported, the operation ends in an error.

— Get log all: All the SMC event log data recorded in a server is acquired sequentially from the oldest one and displayed by activating the Windows standard editor WordPad. Since it takes time to make an inquiry to the server, [Connecting] is displayed in the title bar. The operator can do nothing in the dialog box while the message is displayed.

Troubleshooting

This section briefly explains problems and mistakes that may occur during MWA operations.

Problem: The Select a server dialog box does not display server information.

Probable Cause: Server SG information is not registered or the information has been lost. Register the server SG information again.

Problem: MWA cannot be operated after the reset command was executed.

Probable Cause: When some reset commands are issued, MWA waits for a response and cannot perform other operations. Wait for a while.

Problem: The Read button cannot be selected in the Data dialog box.

Probable Cause: Data read from a server is restricted as follows:

The server is connected.

CMOS data and DMI data can be read at the end of POST. Stop server processing at the end of POST by selecting the Pause POST command and the Go to End of POST command from the Pop-up menu in the server window.

Problem: A remote drive cannot be used.

Probable Cause: See *Using a Remote Drive*.

Problem: Booting from a remote drive failed.

Probable Cause: Check the following:

The remote drive is set correctly.

The remote drive is a floppy disk (or a FD image file) from which MS-DOS can be booted.

The priority of the boot device of the server is a floppy disk.

Problem: The server window does not display a server screen.

Probable Cause: A graphic server screen may not be displayed correctly in the server window. The window display becomes normal when the server returns to an MS-DOS screen.

Problem: Characters are corrupted when the server window displays a server screen.

Probable Cause: If MS-DOS is booted in a language other than English, MWA cannot display the messages for this language in the server correctly. Boot MS-DOS in English mode.

Probable Cause: If the server is displaying a graphic screen, MWA may not be able to display the screen correctly.

Problem: When an MS-DOS program is activated in English mode, the server displays corrupted characters.

Probable Cause: If MS-DOS in the server is in English mode, MWA remote console correctly displays messages from the MS-DOS programs in the server. However, the server cannot display messages for other language correctly.

Problem: OS cannot be booted from the server disk.

Probable Cause: When the remote drive is set on MWA, the server is booted from the remote drive. Cancel the remote drive setting and reset the server.

Problem: The floppy disk drive on the server cannot be used.

Probable Cause: When the remote drive is set on MWA, drive A: on the server is assigned remote drive on the management PC. Cancel the remote drive setting and reset the server.

Problem: MWA cannot connect to the server.

Probable Cause: Check each item in Step 7 of *Creating a Server System Generation Diskette*.

C

System Status Hardware Support Information

System Status Hardware Support Information

This appendix helps you identify and find a system status hardware item indicated by a software monitoring component.

The software monitoring component as it is related to the hardware system status item is listed in Table C-1:

Table C-1. Software Monitoring Component/Hardware System Status Item

Software Monitoring Component	Hardware System Status Item
ESMPRO Server Management	View status based on polling the machine

Not all items can be monitored with every software component. Monitoring capability relates to how the software component interacts with system hardware. ESMPRO interacts with all hardware components. (See Figure "System Chassis (Right Side View)" under "System Overview" in Chapter 1 of this guide.)

The "Monitor Matrix" table below shows a component relating to selected status item. This table also relates the terminology used by the software component to the system hardware.

Table C-2. Monitor Matrix

Item	ESM PRO	Item Location	Board Marking
CPU rear fan	As Item	Baseboard	Fan2 P10
Front HDD fan	As Item	Baseboard	Fan3 P27
CPU front fan	As item	Baseboard	Fan4 P28
Intrusion switch – front (tower only)	Chassis cover	Baseboard	P32 switch
Interlock switch - left side (front view)	N/A	Baseboard	P32 switch

SCSI-BP = SCSI Backplane

Glossary

A

AC
(Alternating Current) The type of current available in wall outlets. All computers must convert alternating current to direct current to operate. See also DC.

address
A label, name, or number that identifies a location in computer memory.

ASCII
(American Standard Code for Information Interchange) A standard number assigned to each of the alphanumeric characters and keyboard control code keys to enable the transfer of information between different types of computers and peripherals.

B

backplane slot
A connector on the backplane board in desktop computers and expansion boxes that allows you to install circuit cards.

backup
A copy of data for safe-keeping. The data is copied from computer memory or disk to a floppy disk, magnetic tape, or other media.

backup battery
The battery in your computer that maintains the real-time clock and the configuration information when the computer's power is removed.

base memory
An area of memory between 0 and 640 kilobytes.

baud rate
The speed with which data is transmitted during serial communication. The computer's operating system and software program must be configured for the same baud rate as the communication device, such as a serial printer. See also bps.

BIOS
(Basic Input/Output System) A program stored in flash EPROM or ROM that controls the keyboard, disk drives, video monitor, and other devices. See also flash EPROM, EPROM, and ROM.

bit
Derived from BInary digiT, a bit is the smallest unit of information a computer handles. See also byte.

BMC

(Baseboard Management Controller) Contains all of the server management functions. One major function of the BMC is to monitor system management events and log their occurrence in the System Event Log (SEL).

boot

The process of loading the operating system into memory.

bps

(bits per second) The number of bits transferred in one second during serial communication, such as modem transmission.

byte

A group of eight bits.

C

cache memory

A very fast, limited portion of RAM set aside for temporary storage of data for direct access by the microprocessor.

CD-ROM drive

(Compact Disk ROM drive) A type of mass storage device that reads information from a compact disk.

Centronics port

An industry standard parallel port. See also parallel port.

CGA

(Color Graphics Adapter) A type of video display system that provides low-resolution text and graphics on TTL monochrome and color monitors.

CMOS

(Complimentary Metal-Oxide Semiconductor) A type of low-power integrated circuit used in computers. See also TTL.

COM1 or COM2

The name you can assign a serial port to set or change its address. See also serial port.

command

An instruction that directs the computer to perform a particular operation.

configuration

The way in which a computer is set up to operate. Some configurable options include CPU speed, serial port designation, and memory allocation.

coprocessor

See math coprocessor.

CPU
(Central Processing Unit) See microprocessor.

CRT
(Cathode-Ray Tube) The type of video display used in monitors for desktop computers.

D

DC
(Direct Current) The type of current available in the rechargeable battery packs used in portable computers. See also AC.

default
The factory setting your computer uses unless you instruct it otherwise. For example, when powering up, the computer will boot from the default drive.

density
The capacity of information (bytes) that can be packed onto a storage device, such as a floppy disk.

device driver
A software program that a computer must use to recognize and operate certain hardware, such as a mouse or a video monitor.

disk drive
A device that stores data on a hard or floppy disk. A floppy disk drive requires a floppy disk to be inserted; a hard disk drive has a permanently encased hard disk.

DOS
(Disk Operating System) See operating system.

DRAM
(Dynamic RAM) See RAM.

E

ECC
(Error Checking and Correction) A method of detecting and correcting errors.

EEPROM
(Electrically Erasable Programmable Read-Only Memory) A type of memory device that stores password and configuration information.

EGA
(Enhanced Graphics Adapter) A type of video display system that provides medium-resolution text and graphics on TTL monochrome, color, and enhanced color monitors.

EMP

The Emergency Management Port (EMP) provides an interface to the console manager. This interface allows remote server management via a modem or direct connection.

EMS

(Expanded Memory Specification) A method of accessing memory beyond the 640K limit of DOS by exchanging data in and out of main memory at high speeds. Some software requires EMS to operate.

EPROM

(Erasable Programmable Read-Only Memory) A type of memory device that is usually used to store system BIOS code. This code can be erased with ultraviolet light, but is not lost when the computer is powered off. See also flash EPROM and ROM.

expansion slot

See backplane slot.

extended memory

The protected memory above 1M that is directly accessible by the microprocessor through certain utilities and operating systems.

F

fault resilient boot (FRB)

Logic on the system board, controlled by the System Management Board Controller, that allows the system to continue to boot when system errors occur.

flash EPROM

A type of memory device that is usually used to store system BIOS code. This code can be replaced with updated code from a floppy disk, but is not lost when the computer is powered off. See also EPROM and ROM.

floppy disk drive

See disk drive.

format

The process used to organize a hard or floppy disk into sectors so it can accept data. Formatting destroys all previous data on the disk.

G

(Gigabyte)

1,073,741,824 bytes. See also byte.

H

hard disk drive
See disk drive.

hardware
The physical parts of your computer, including the keyboard, monitor, disk drives, cables, and circuit cards.

hot swap
A method used to insert or remove SCSI disk drives into or from an operating bus. This method is typically used in RAID subsystems. When used in non-RAID subsystems the operating system must typically be restarted.

I

IC
(Integrated Circuit) An electronic device that contains miniaturized circuitry.

IDE
(Integrated Drive Electronics) A type of hard disk drive with the control circuitry located inside the disk drive rather than on a drive controller card.

interface.
A connection between the computer and a peripheral device that enables them to exchange data. See also parallel port and serial port.

ISA
(Industry Standard Architecture) An industry standard for computers and circuit cards that transfer 16 bits of data at a time.

J

jumper
A small electrical connector used for configuration on some computer hardware.

K

(Kilobyte)
1,024 bytes. See also byte.

L

LAN
(Local Area Network) A group of computers linked together within a limited area to exchange information.

LCD
(Liquid Crystal Display) The type of video display used in portable computers.

LED
(Light-Emitting Diode) A small electronic device that glows when current flows through it.

LPT1 or LPT2
The name you can assign a parallel port to specify its address. See also parallel port.

LVD
Super-fast Ultra 2 SCSI Low Voltage Differential (LVD) Parallel SCSI Interface. A new SCSI interface that provides greater I/O bandwidth, device connectivity, data reliability, and longer cable lengths for Ultra2 SCSI hard disk drives. Note that in order to achieve LVD performance all devices including cable, controller, and drive must support LVD.

M

(Megabyte)
1,048,576 bytes. See also byte.

memory
The circuitry in your computer that stores data and programs. See also EMS, extended memory, RAM, and ROM.

microprocessor
The integrated circuit that processes data and controls the basic functions of the computer.

modem
A device used to exchange information with other computers over telephone or data lines.

module
A circuit board that plugs into a dedicated connector on the system board in your computer.

mouse
A small input device that you guide on a flat surface to control the cursor movement and operation of the computer when using certain software programs.

N

NVRAM
(Nonvolatile RAM) A type of RAM that retains its contents even after the computer is powered off. This memory stores EISA configuration information. See also RAM and SRAM.

O

operating system
A set of programs that provides the interface between other software programs and the computer.

P

parallel port
The connector on the back of your computer that allows the transfer of data between the computer and a parallel device, such as a parallel printer.

partition
The process of dividing the storage space on a hard disk into separate areas so that the operating system treats them as separate disk drives.

password
A security feature that prevents an unauthorized user from operating your computer. See also EEPROM.

PCI
Peripheral Component Interconnect. PCI is a high-performance peripherals I/O bus supporting data transfers of up to 528MB per second.

Pentium
A type of microprocessor, with a built-in math coprocessor, cache memory, and memory and bus controllers, that processes and communicates 32 bits of data at a time. This microprocessor also contains power management capabilities.

peripheral
A device connected to and controlled by the computer, such as an external disk drive or a printer.

pixel
The smallest element that is visible on a video display. The resolution of a video display system is measured in pixels.

PnP
(Plug-n-Play) Plug-and-play is the ability to plug a device into a computer and have the computer recognize that the device is there. The user doesn't have to tell the computer.

POST
Power-On-Self-Test.

R

RAM
(Random-Access Memory) A temporary storage area for data and programs. This type of memory must be periodically refreshed to maintain valid data, and is lost when the computer is powered off. See also NVRAM and SRAM.

real-time clock
The IC in your computer that maintains the time and date.

ROM

(Read-Only Memory) A type of memory device that usually is used to store system BIOS code. This code cannot be altered and is not lost when the computer is powered off. See also BIOS, EPROM, and flash EPROM.

RS-232C port

An industry standard serial port. See also serial port.

S

SAF-TE

(SCSI Accessed Fault Tolerant Enclosure) A specification for monitoring the state of the drives and enclosure environment (fan, power supply, temperature, etc.) using the SCSI bus to indicate faults.

save

To store information on a floppy disk, hard disk, magnetic tape, or some other permanent storage device.

SCSI

(Small Computer System Interface) An industry standard interface that provides high-speed access to tape drives, hard disk drives, and other peripheral devices.

SEL

(System Event Log) A record of system management events. The information stored includes the name of the event, the date and time the event occurred and data pertinent to the event. Event data may include POST error codes that reflect hardware errors or software conflicts within the system.

serial communication

Information sent sequentially, one bit at a time.

serial port

The connector on the back of your computer that allows the transfer of data between the computer and a serial device, such as a mouse, a modem, or a serial printer.

setup program

The program that you use to change the configuration of some ISA desktop and notebook computers. This program also contains information about the hardware in the computer.

software

Programs with specific functions, such as word processing, data base management, communications, and operating system.

SRAM

(Static RAM) A temporary storage area for data and programs. This type of memory does not need to be refreshed, but it is lost when the computer is powered off. See also NVRAM and RAM.

SVGA

(Super VGA) A type of video display system that provides very high-resolution text and graphics on analog color monitors.

system board

The main circuit board in your computer. It contains most of the connectors and ports.

T

tape drive

A type of storage device using magnetic tape.

TTL

(Transistor-Transistor Logic) A type of integrated circuit used in computers. See also CMOS.

U

ultra 160/m SCSI

Ultra 160/m is a parallel SCSI interface based on Ultra3 SCSI technology. This interface features data transfer speeds up to 160MB/second (double-edge clocking), cyclical redundancy checking (CRC) providing higher levels of data reliability, and domain validation that detects the configuration of the SCSI bus and automatically tests and adjusts the SCSI bus transfer rate to optimize interoperability. Note that the Ultra 160/m uses the standard Ultra2 LVD cabling and termination, making it backward compatible for easy implementation.

V

VGA

(Video Graphics Array) A type of video display system that provides high-resolution text and graphics on analog color monitors.

Equipment Log

Use this equipment log form to record pertinent information about your system. You will need some of this information to run the System Setup Utility. Be sure to update the equipment log when you add options.

Record the model and serial numbers of the system components, dates of component removal or replacement, and the name of the vendor from whom the component was purchased. Be sure to record the same information for any components added to the system, such as a power supply, hard disk drives, add-in boards, or printers.

Record the model and serial numbers of the unit and system baseboard. The model and serial numbers of the system unit are recorded on a label attached to the rear of the unit. The serial number of the system board is located along the left side of the board, near the PCI expansion slot covers.

The location of serial numbers on add-in boards, hard disk drives, and external equipment, such as video displays or printers, varies from one manufacturer to another. Literature accompanying these products should illustrate or describe the location of model and serial numbers.

Component	Manufacturer Name & Model	Serial Number (if available)	Date Installed
Server			
System Board			
Processor 1			
Processor 2			
DIMM Slot 1			
DIMM Slot 2			
DIMM Slot 3			
DIMM Slot 4			
Modem			
Diskette Drive A			
Tape Drive 1			
Tape Drive 2			
CD-ROM Drive 1			
Hard Disk Drive 1			
Hard Disk Drive 2			
Hard Disk Drive 3			
Hard Disk Drive 4			
Hard Disk Drive 5			
Hard Disk Drive 6			
Optional RAID Controller			
Network Controller 1			
Network Controller 2			
Monitor			
Keyboard			
Mouse			
External Peripheral 1			
External Peripheral 2			
Power Supply			

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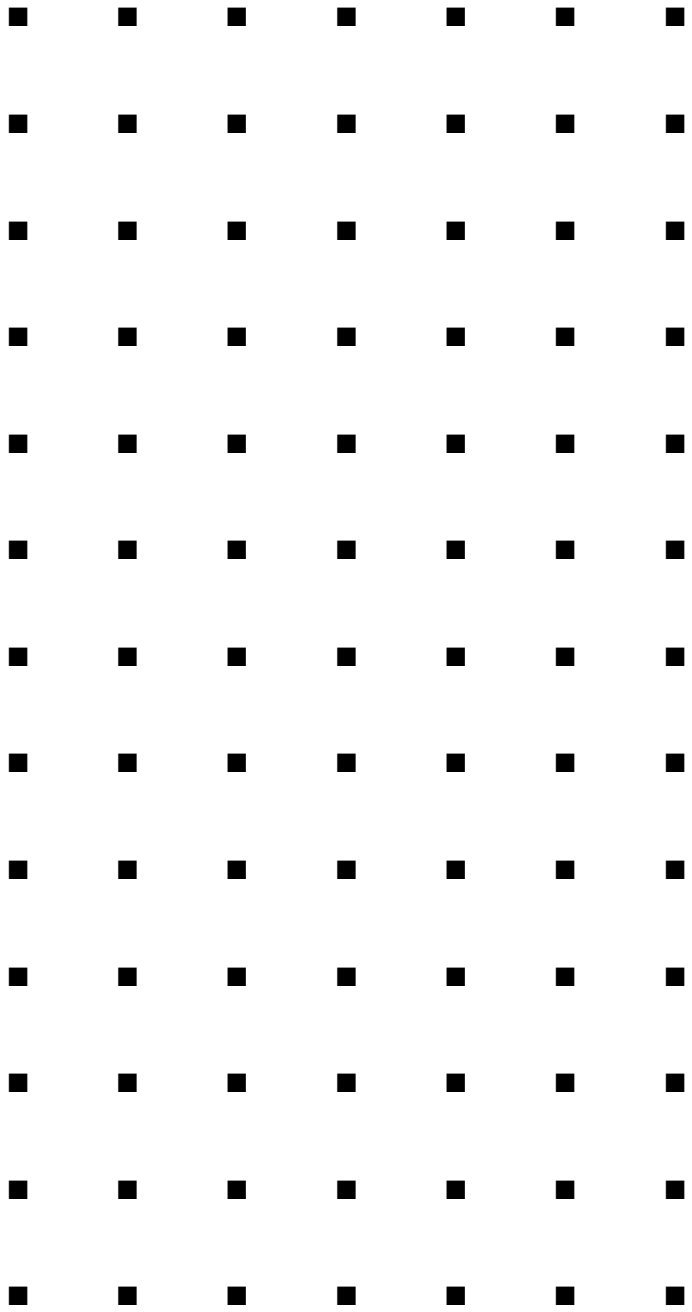
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